

# THE IRON AGE

THURSDAY, DECEMBER 4, 1890.

## Harnessing Niagara.

### THE FALLS TO BE UTILIZED

The Falls of Niagara, since first seen by Father Hennepin in 1678 and pictured and described in his well known book issued in 1697, have remained unrivaled as the grandest cataract in the world. Those who are familiar with the present appearance of the falls will appreciate the changes which have taken place in the past 200 years by examining the engraving on this page, which shows its aspect at the time of Father Hennepin's visit. When he saw the falls he pictured and described two straight breasted falls with an island between them, and a third fall dashing from the cliff at right angles. In regard to this third fall, he says that it is composed of two great cross streams of water and two falls with an isle sloping along the middle. He places the depth of the "dreadful gulf" into which the water plunges at 600 feet. He gives the width at from one-half to three-quarters of a league. While Father Hennepin's drawing shows a far different form to what is seen today, its main features were corroborated some years later. In 1751 there was published a descriptive letter of the Falls in the *Gentleman's Magazine*, in which the measurements more nearly correspond to what we know to be the condition now, although considerable changes have taken place in the central or Goat Island.

In addition to the attraction which the falls have attracted because of their grandeur, the dream has been long held by engineers of utilizing a part of the power now going to waste, and of making the falls industrially useful. This dream now seems in a fair way to be realized. That the undertaking is practically and economically possible there is no doubt. The vast magnitude of the torrent may be inferred from the reported statement of the late Sir William Siemens, that if all the daily output of coal in the world could be used in making steam to drive pumps it would barely serve to pump back the water now flowing down Niagara River.

Of the many schemes to harness a part of this great power none (with the exception of one of little consequence mentioned later), until the advent of the present one ever advanced further than paper. Since the engineering difficulties have never been considered as insurmountable, we may look to the true cause of the failure of former attempts to the fact that the great majority of Americans insist upon preserving unmarred the grandeur of the falls. It may be concluded that for this reason all ideas to utilize the power at the face of the falls by means of any structure whatever, the artificial character of which would be apparent, have been promptly frowned down. The Niagara Falls Power Company have been organized

to execute a plan for taking about 120,000 horse-power from the falls at a point from one to two miles above the fall on the American side. Land for this purpose has been secured and the first part of the undertaking has been set in motion.

#### THE PLAN IN GENERAL.

The Niagara Falls Power Company were incorporated by the New York Legislature in 1886. Their officers are Edward D. Adams, president; Francis Lynde Stetson and Edward A. Wicks, vice-presidents; William B. Rankine, secretary; and George H. Kent, treasurer. A contract for the work has been made with the Cataract Construction Company, and operations have been commenced upon the tunnel, shafts and raceways. According to the contract, the first section of the work will be completed and the power ready for use by the first of 1892. Albert

eral the method which it is now proposed to carry out.

#### HISTORY.

Many years ago mills were built between Goat Island and the shore where the upper rapids feed the American Falls, the 50 odd feet of fall between the still water above and the sides of these mills giving all the power that was then needed. After this a canal was dug to carry water to mills placed below the falls. When this surface canal, designated the Hydraulic Canal, was constructed the owners of the water right secured a strip of land 100 feet wide from a point above the upper rapids called Port Day to the river below the falls, where the bank reaches an elevation of 212 feet above the water of the lower river. Through this strip a canal was dug 50 feet wide and about 6 feet in depth, leading into a basin parallel with the river, but far enough back to permit factories to be erected close to the edge of the chasm, thereby obtaining a possible head of water of over 200 feet. The mill owners renting power from the Hydraulic Canal Company seldom found it necessary to use over 50 to 100 feet of the head available. At first cast iron turbines were used, but these gave way to wheels of bronze, although at no time were special wheels adapted to high heads ever used. The total power obtained at the present time by means of the surface canal is rated at about 6000, which amount can be further developed by simply utilizing the unused head of water below the present wheels.

It is thought by those who have made the subject one of careful thought that the divergence of many hundred horse-power would not

affect the falls to a noticeable extent, since at the present time there is a wide variation in the amount of water passing over, owing to the action of the wind in setting the water of the lakes back or driving more into the river, these natural fluctuations producing a more decided change in the appearance of the falls than would be created by artificially leading a large quantity of the flow away. The present company have obtained control of all the franchises necessary to secure full right of the water power owned by the Hydraulic Canal Company, and since they fully appreciate the sentiment of the people against any enterprise that would detract from the beauty of the falls, they will put all their structures so far back as to be practically unnoticed.

#### THE PRESENT PLAN IN DETAIL.

The accompanying map, Fig. 2, shows the proposed line of the tunnel. Fig 3 is a section parallel with the line of the tunnel, and it shows the form of the canal and wheel pits, while Fig. 4 is an enlarged cross section, showing the tail race tunnel, the lateral or branch tunnels leading from the bottom of the wheel pits to the tail race and the canal which is to supply water to the wheel pits. It is evident that in the carrying out of a plan of this description the construction of the tail race is of



FAC-SIMILE OF THE FIRST ENGRAVING EVER MADE OF NIAGARA FALLS.

H. Porter is the resident engineer; John Bogart and Coleman Sellers, consulting engineers, and Clemens Herschel, hydraulic engineer.

The plan proposed is to construct a tunnel about 6700 feet in length and 490 square feet in section, from a point on the river a little over a mile above the falls to a point on the river just below the Suspension Bridge. The water will be taken where the river is deepest close in shore, and where borings show the rock formation to be well fitted for the purpose. The first conception of this scheme contemplated short surface canals, one main tunnel and lateral or cross tunnels, the canals taking water to wheel pits, from which the water that passed the wheels was discharged into the tunnel, the tunnel thereby serving merely as a tail race. While this method is certainly feasible, its cheapness will depend in a great measure upon the distance the water is carried and upon the value of the land condemned for the use of the company, and further, the material through which the work is carried. It offers, however, an independent source of power to each applicant, a never failing and never varying supply of water, free from sediment and which will not be obstructed by ice in the winter, and over which the users can have perfect and independent control. The above is in gen-

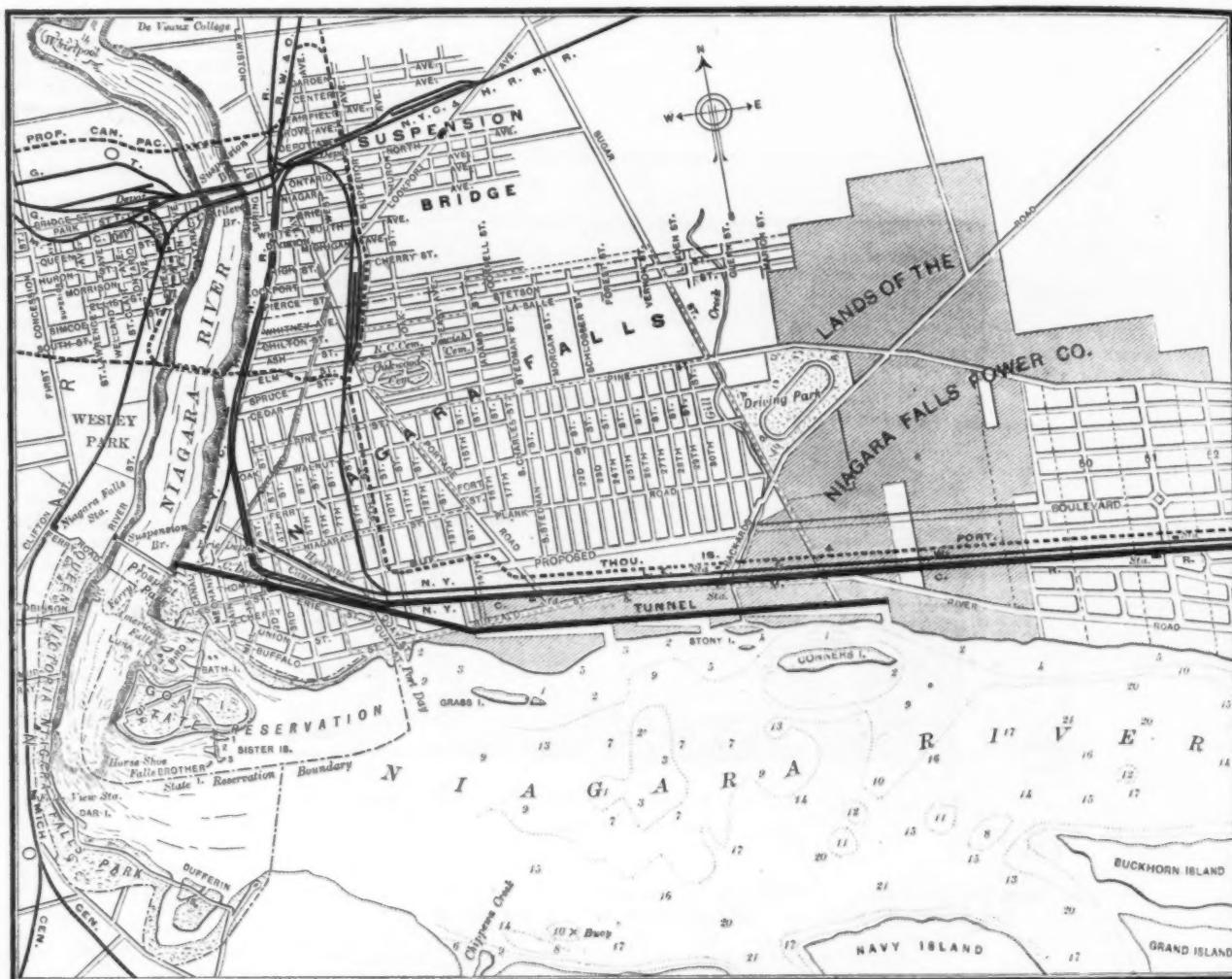
the first consideration. It is possible that the plan may be so modified as to permit the concentration of the wheels at one general point or central station, from which the power could be distributed. This would certainly save the expense of much underground work, and with suitable machinery it is possible to distribute power to any desired point. By means of borings enough is known of the character of the underlying rocks to warrant the engineers recommending an unlined tunnel to act as a tail race. Before deciding upon the method above outlined of utilizing the power, Edward D. Adams, the president of the company, together with Dr. Coleman Sellers, visited Switzerland for the purpose of examining the methods

average water height, so that when finished only the arched roof will show above the surface of the river. A tunnel 270 feet wide and 10 feet deep would be required to convey the water from the upper river to the brink of the chasm made by the lower river in order to obtain the power it is now proposed to utilize. It is assumed that the same amount of power can be obtained on the Evershed plan, of which this is the outcome, by means of a tunnel passing under the town, the sectional area of which is as above stated, and on which a velocity can be maintained of over 25 feet per second.

The country about the falls on the American side is almost a level plain. The town of Niagara Falls, according to

Falls of Niagara.....	160
Rapids immediately above the falls.....	50
Upper Niagara River.....	6
Total fall.....	326

The Niagara River forms the boundary between Canada and the State of New York, the international boundary passing in the middle of the channel which forms the Horseshoe Falls, which are 158 feet high and 600 feet wide. The other channel is wholly in the State of New York, and forms what is known as the American Falls, which are 169 feet high at the eastern side and 100 feet wide, both falls comprising 3600 lineal feet of water. At the falls the river turns directly at right angles and flows through a gorge, the



Harnessing Niagara.—Fig. 2.—Map of Niagara Falls, Showing Proposed Location of the Hydraulic Tunnel.

there employed of transmitting power from turbines. They also studied the compressed air system introduced by Mr. Popp and now successfully working in Paris. Sir William Thompson was the first person to suggest the employment of electricity for the purpose of transmitting the power.

The company will build a tunnel 490 square feet in section on a slope of 7 feet to 1000 feet. While a circular tunnel running full would be the form that would present the least surface resistance to the flow, yet after careful consideration of the subject they decided on a rectangular section with a semi-circular arched roof. The width of the tunnel is to be 18 feet; height at bottom over the walls to the spring of the arch,  $19\frac{1}{2}$  feet; the roof to be on a radius of 9 feet and the floor to be concave on a radius of 41 feet, making it 1 foot deep in the middle. The lower end of the tunnel, where it discharges into the river, will be about 20 feet below the

last census, has a population of 5400, and yet the 6000 horse-power now developed is barely sufficient to supply the factories already established. The natural conditions are such as to favor the full development of the region for manufacturing purposes if once the necessary power can be obtained. The railroad facilities are unexcelled and navigation by water is at hand.

#### THE AMOUNT OF WATER PASSING THE FALLS.

The Great Lakes, whose only outlet is Niagara River, have a total drainage basin of over 240,000 square miles. The fall of 326 feet between the surfaces of Lake Erie and Lake Ontario occurs in the vicinity of Niagara Falls, and is distributed as follows:

Five miles of rapids, between Lewiston and the lower Suspension Bridge.....	100
Rapids between the bridge and falls....	10

cliffs of which are from 1000 to 1200 feet apart, with perpendicular walls rising 210 feet above the water, which has a maximum depth of 189 feet. One mile above the falls the river is over 600 feet wide. The extreme limits of variation in the depth of the river above the falls is 34 feet, these limits being very rarely attained; the ordinary variation is about 1 foot. The average discharge of water at the outlet of Lake Erie into the Niagara River is estimated to be 265,000 cubic feet per second. It has further been calculated that if the average discharge of all the lakes pass through a river 1 mile wide with a mean velocity of 1 mile per hour such a river would have a depth of 40 feet from shore to shore. The volume of water in the lakes, including Lake Ontario, is about 6,000,000 cubic miles, of which Lake Superior contains a little less than one-half. An idea of this vast quantity of water is conveyed by the

statement that it is sufficient without additional rainfall to continue the present flow over Niagara Falls for about 100 years. Should the company develop 120,000 horse-power with a head of 140 feet they will require about 10,200 cubic feet per second, using wheels of 75 per cent. efficiency. Taking the Lake Survey Board's measurements of the fall of the river at 265,000 cubic feet per second on the average, they would remove from the falls less than 0.04 per cent. of the average flow, while if the head used were greater the diversion of water would be less than the above. The vast extent of the great lakes acting as storage reservoirs, and fed as they are by a watershed of nearly 250,000 square miles, or a territory double the area of Great Britain and Ireland, insures a uniformity of supply not

The secretary of the commission is Prof. W. E. Unwin, F.R.S., professor of engineering at the Central Institution of the City and Guilds of London, who has considered carefully many of the scientific questions involved, and who is especially acquainted with hydraulic engineering. The commission will meet in London on January 29, 1891. The invitations issued by the company were addressed to certain individuals and firms who had had experience in the line of work required. They were asked to submit plans under conditions satisfactory to both parties, the compensation tendered being what is expected to secure careful study, independent of the pecuniary recompense placed at the disposal of the commission, to schemes that are considered fully deserving of such recognition.

4. Level and vacant lands and low river banks, readily available for the erection of manufactures, with access thereto by water and rail.

5. About 10 feet of soil overlying horizontal strata of rocks, all sufficiently hard to permit the excavation of chambers and shafts, wheel pits, tunnels, &c.

Projects have been invited for one central station, located at the head of the tunnel, for:

1. The economical development of as much power as the section of tunnel, the head of water and the hydraulic slope will permit, and

2. Transmission and distribution of this power overhead, underground, by electricity, compressed air, water, cable, or other means, to:

(a) A manufacturing district to be built up within a radius of 4 miles, and

(b) The city of Buffalo, distance about 20 miles.

It is suggested that the central station be so designed:

1. That a combination of methods of transmission and distribution may be employed, according to the probable demand therefor by various classes of industries.

2. That a block of 50,000 horse-power may be specially designed for the Buffalo transmission, and

3. That the entire capacity of the tunnel may be developed gradually in blocks of from 10,000 to 20,000 horse-power each.

The methods of transmission or distribution should be those best suited to large manufacturing cities, requiring:

1. Electricity for domestic, street and manufacturing purposes.

2. Water for power, domestic, fire and manufacturing uses, and

3. Air for power, ventilating and refrigerating and many uses to which it lends itself.

The existing tram roads, as well as those in contemplation and required by the circumstances of the case, will call for a careful study and selection of the motive power that may be furnished cheaply by this company.

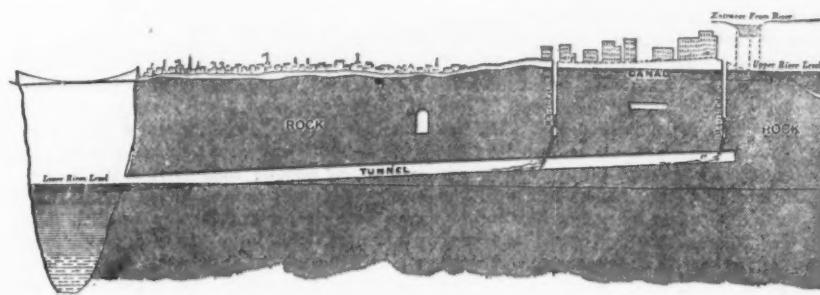
The work before the International Niagara Commission will practically begin by January 1, 1891, at which time the plans asked for will be laid before them.

#### WORK DONE SO FAR.

Work on the tunnel was begun October 4 last. The resident engineer, Albert H. Porter, began a careful survey of the property as soon as the land came into the possession of the company. The topographical survey of the land owned by the company and of the principal and alternate right of way for tunnels has resulted in a full contour map of the land above and under water, together with rock soundings over the greater part of the property, more especially where the canals will be situated.

The American correspondent of the London *Statist* says: "The Calumet and Hecla is believed to have a large amount of copper in store, and this is what is hanging over the market. There is fear that this great company may break the price. Colonel Livermore, the company's general manager, was seen in Chicago on his way to the lake last week by a friend of mine, and he told my informant the Calumet and Hecla has some 14,000,000 pounds of copper in store and unsold, and the price of the metal must come down after January 1. The study with the Calumet and Hecla is how to bring this about without hurting the smaller mines, says Mr. Livermore, who adds that consumption has fallen off inexplicably. He is said to have expressed belief in 15½ cents for copper early in 1891, and on this idea the uneasiness has grown, with results as above mentioned. Now, all of this may be ill-based, and only the outcome of natural attempt to explain weakness in copper stocks, but there is no denying the fact that the copper situation is unsettled, and that the impression is widespread that for some reason, as yet unexplained, consumers are reducing demand for lake ingot copper, and that the price thereof must go lower."

The recorded valuation of Spreckel's sugar refining plant in Philadelphia is \$4,000,000.



Harnessing Niagara.—Fig. 3.—Vertical Section Parallel with Line of Tunnel.

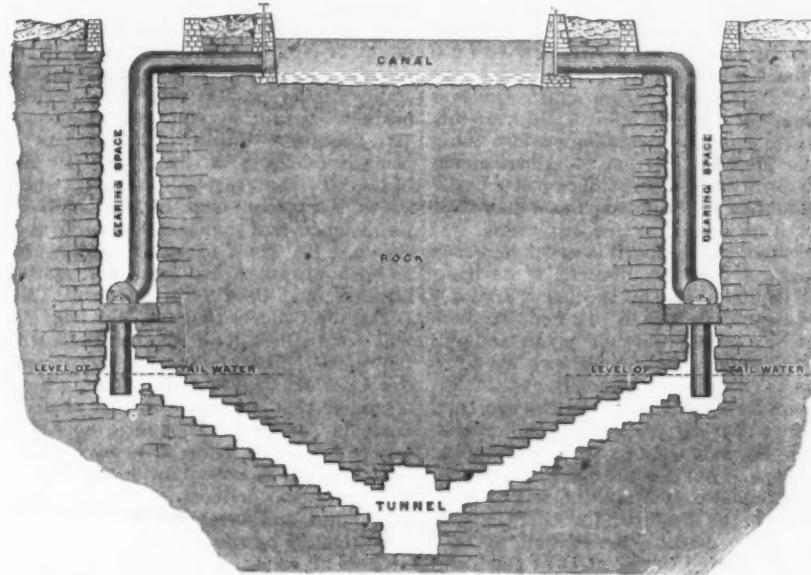


Fig. 4.—Enlarged Cross Section of Main and Branch Tunnels and Wheel Pits.

to be found in any other stream in the world that is capable of being used as a source of power.

#### UTILIZING THE POWER.

The exact method of developing the power it is expected to derive at this point has not as yet been decided upon. A commission has been appointed, consisting of Sir William Thompson, as president; Prof. Coleman Sellers, Philadelphia; Professor Engineering Practice, Stevens Institute of Technology, Hoboken, N. J.; Professor of Mechanics, Franklin Institute; Prof. E. Mascart, membre de l'Institut, Paris, Professeur au Collège de France, Directeur du Bureau Central Météorologique, representing France, and Theodore Turrettini, of Geneva, Lieut. Colonel d'Artillerie, Président de la Ville de Genève, Directeur des Travaux d'Utilisation des Forces Motrices du Rhône à Genève, Director of the Société Génoise d'Instruments de Physique.

The following is the general outline prepared by the commission:

(a) For hydraulic projects for the primary development of power by turbines or other water motors.

(b) Projects for the transmission and distribution of power from the primary (a).

(c) Projects combining both development and transmission (a) and (b) combined.

The terms being most favorable to those who come in under class (c) has led to combinations of talent which must result in the questions involved being worked out by the highest available scientific authorities.

As this is essentially an American enterprise, all communications are to be in the English language, and the dimensions of plans and all calculations to be expressed in English measures, and the financial statements in dollars at the rate of 5 francs per \$1, and \$5 per £1 sterling.

In considering the question the following data has been furnished by the company:

1. Unlimited and never failing water, with comparatively small amount of sediment.

2. Constant net fall of 140 feet.

3. A tail race or tunnel, about 6700 feet long, with a section of 490 square feet, with a hydraulic gradient of about 7 feet per 1000.

## Through English Eyes.

### Our Industries as Viewed by Foreign Visitors.

A good many attempts were made by enterprising journalists to draw out our foreign visitors while they were traveling in this country. They proved very reticent, and were willing only to say pretty things of their hosts and of American hospitality. Now that they have returned to their homes they show a disposition to talk more freely and to the point. That the views which they express are surprising in some instances is to put the matter mildly. The London *Engineer* has collected some of the interviews printed in local papers. Others have come to us direct.

#### A SHEFFIELD FORGE MASTER.

George Siddell of Roewood, Pittsmoor, Sheffield, was for many years the forge manager at the River Don Works of Vickers, Sons & Co. There he wrought out a contrivance which effected a most important saving in manual labor in the manipulation of heavy forgings. He afterwards superintended the erection of the heavy forging press at the Atlas Steel and Iron Works—John Brown & Co. Mr. Siddell, who was one of the large Sheffield party which went to the United States under the auspices of the Iron and Steel Institute, states that he was much impressed with the abundant resources of America, the rapidity of its industrial development, the activity and enterprise of its people, and their industry and application. Mr. Siddell said that everything in America was on a very extensive scale, except in two respects—great guns and great ships—and these they would have yet. If it was a fact, as had been stated, that the Government had bought up the nickel mines, it meant that they were going to make armor plates on a very different scale from what they had hitherto attempted. In American manufactures there was no consideration of expenditure as to plant and machinery, and labor saving appliances were utilized to such an extent that in the iron and steel works, and especially the rail and plate mills, manual labor is cut down to what the Americans themselves term "the small end of nothing." In this respect they beat even the great firms of Boilckow, Vaughan & Co., at Middlesbrough, or the Barrow Hematite Steel Works, though at these and other establishments every English improvement is promptly adopted. Mr. Siddell did not go into the great rail mill at Chicago, which is said to be the finest of its kind in the States. His remarks applied generally to the production of rails and ship plates. The output, he thought, did not exceed what was done in England. The Consett Iron Company, he believed, turned out about four times as much as the biggest American mills. At Andrew Carnegie's establishment he was told that the production was about 4000 tons a month,\* which was about the weight produced at Consett in a week. He was very much struck, however, with what he saw at Carnegie's. "It is a magnificent place," he said; "there is nothing in England can touch them. Some of the melting furnaces have a capacity of 35 tons, and I don't think there are any in England greater than 30 tons. They have got many circular furnaces, too, which I have not seen in

England; but I do not know that there is any great advantage in that mode of construction. At Chicago, I believe, they roll direct from the ingot without reheating, which is also done in some of our works; but at Carnegie's they roll from the bloom, which I consider is much the safer plan." Mr. Siddell thinks the American rail mills beat us, but he did not come across anything very wonderful done there in the shape of large forgings. He found nothing beyond 10 tons, whereas in Sheffield the firms can run up to any weight that is required. He had not the opportunity of going over the Bethlehem Works, where the Government orders for gun forgings are done. Sir Joseph Whitworth & Co. had recently sent to Bethlehem a forging press which, it was thought, had something to do with the exclusion of the visitors. Mr. Siddell thinks there is a splendid opportunity for energetic Englishmen to go out there and embark in the heavy trade. He believes they might promptly pile up a fortune, because there is no heavy work done there yet. The Americans are just commencing with the guns, and any one well up in gun forging could command his own price. It struck Mr. Siddell that the American working men did a deal more work for their money than the Englishmen. A good many of the mills are run at a greater speed than the English mills, and the men had to be quick to keep pace with them. They appeared to him to be more temperate than Englishmen, owing perhaps in part to there being no drink sold on Sundays in Pittsburgh and many other places. Many men who had gone out from England had done exceedingly well. He saw two old workmen who used to be with him at the River Don Works years ago. One was manager of a works, and could keep his carriage and pair; the other was also doing well. He thought that in America men with ability and perseverance had a better chance than in England; but a man must work if he wanted to live out there. "I think, too," he said, "it is easier for a man to make a start for himself, if he has a little capital. But in the heavy trades a good deal of capital is required, as there must be a large outlay for plant, and you must be able to hold your own for a few years. The cost of plant is great. Mr. Samson Fox has a place in Chicago, and the duty charged on his hydraulic press, which he sent out from England, was enormous. But for the Tariff the American manufacturers would be able to compete with the English, for there is very little labor used." Mr. Siddell, asked if he was referring to the effect of the Tariff on the cost of the raw material, replied: "Yes, the machinery is splendid; there is nothing like it in England. They seem to spend all their profits on extensions."

Questioned as to the McKinley Act, he said he found the manufacturing towns generally in favor of it. The workingmen liked it, because it would keep the work at home. Mr. Siddell was greatly impressed with the oil wells and the natural gas bores. At one place they were shown a complete mountain of iron ore, which had been bored for 300 feet down, and they had still not got through the magnetic ore. One of the members of the Institute had a piece of silver got out from the bed of Lake Superior. Although nearly all the Pittsburgh works used the natural gas as a fuel, the supply showed signs of giving out, the pressure having already diminished to one tenth of what it formerly was. It had been stated in one of the American papers, that in certain districts natural gas was being refused to manufacturers. Should the supply fail, American manufacturers would be deprived of a very great advantage. Mr. Siddell was also particularly struck with the greater use made of electricity in the States, not

only for street and domestic lighting, but as a motor for street cars, which are propelled at a much higher rate of speed than English trams, and travel curves so acute as to try the nerves of an Englishman. "A road as steep as Derbyshire lane"—a stiff bit of hill road near Sheffield—"was mounted in Allegheny City at 12 miles an hour, and the cars are allowed to run at 22 miles an hour on the level." Indeed, Mr. Siddell regards the facilities for locomotion in the great cities as one of the most remarkable characteristics of American progress. Summing up the result of his visit, Mr. Siddell said he had no doubt the members of the Institute had gained a large amount of valuable information as to the material resources of America and the future possibilities they involved; but he did not think the engineers had gained very much from a mechanical point of view.

#### AN ENGLISH TOOL MAKER.

E. Dickinson, secretary of the Hardy Patent Pick Company, mining tool works, Heeley, Sheffield, was surprised that English firms had not more generally established branches in America. Of course, he admits that there is the protective principle to contend with, but he urges that as a strong reason why English manufacturers who have done a good trade with America in the past should have sought to counteract the influence of the tariff by starting branch works. This applies, he says, with special force to cutlery. "I suppose," he said, "the principal cutlery firms in Sheffield have not cared to try the experiment. Perhaps they have lacked the enterprise; but no doubt it would have paid them handsomely. They would have gained considerably higher profits from the American business than they can get at home." Mr. Dickinson thinks it is too late in many instances to do this now. He also instanced the carpet business, which might have been kept in the hands of Englishmen had sufficient enterprise been shown. He knew of many cases where English workmen had gone out, started business, and been very successful. Mr. Dickinson believes that the McKinley act will eventually kill all English trade with the States. That, he says, is the purpose the American had in view. They are determined that all they consume shall be made in America. They have no objection to its being made there by Englishmen; in fact, in several cities they offer to give land and indemnify the producers from rates and taxes for 10 or 12 years, conditionally on their employing a certain number of men. It was admitted on all hands that the Americans could not in any way compete with Sheffield in cutlery, but the prices at which English cutlery must now be sold will entirely prevent the poorer classes from using it. The wealthy Americans invariably use English cutlery of the highest class, which would not be so seriously affected, at least not for the present, but by having the trade fostered, as it will now be, the Americans will eventually succeed in making good cutlery. He thinks that the Americans are perfectly satisfied with their system. Our time for retaliation, he is afraid, has gone by. The only way out of the difficulty is for English firms to make up their minds to have a share in the plunder by opening up works in the States. "There is any amount of opening for British capital." As regards the heavy trades, experienced members of the Institute expressed the opinion that the Americans were in no way in advance of English makers as regards machinery. They seem, however, to obtain a greater output with the same plant—the result of working at higher pressure, with longer hours, and with better organization than we have. "The American," said Mr.

\* Mr. Sidell is misinformed. The Edgar-Thomson Works have a record of 32,500 tons of rails in one month, or double that of Consett. There is not a single English establishment, which, with the same equipment, approaches half a dozen American works.—*Editor The Iron Age.*

Dickinson, "is not so well off as the English workman, so far as his personal liberty is concerned; but he is more anxious to improve his position, and to accumulate 'the almighty dollar.'" The manufacturers in their markets had the advantage of working considerably longer hours than our men do, and got through more work. This is attributable to the general system of piecework that prevails. In most of the large works the only day workmen are the laborers about the yard. The work is let, in the first place, to large contractors, who in their turn let it to smaller ones, and so it goes on down to the bottom. Still, Mr. Dickinson does not think this results in anything like sweating. The men all appear to be well paid. Taking them all round, they will get about double what men receive in this country for the same class of work; but then the purchasing power of the money is not equal to what it is here. But they work harder and are encouraged to put in more time by the manufacturers.

On the great question of Trades' Unionism, Mr. Dickinson does not think trades combinations are as powerful in the States as in England. A general union called the "Knights of Labor" was getting into disfavor, and separate associations being formed in the various trades on the lines of English organization. To this movement the employers offered strong opposition, in many places refusing even to employ union men. There were few disputes except on the railway systems and the tram lines. This happy immunity was, owing to the continual run of prosperity, enjoyed alike by the employer and the workmen, which left very little surplus labor. "The American workman," said Mr. Dickinson, "is much more temperate; there is considerably less drinking. He also dresses well. In the smaller cities, at any rate, they have very comfortable homes. Taking them all round, they are intellectually of a higher class than the bulk of English workmen. This is due in some measure to the Americans having induced our best workmen to go over there. In most works the managers and foremen and the most skillful hands are Englishmen." Mr. Dickinson thinks that the McKinley act will operate against the Americans in neutral markets. The cost of production would be increased, and competition outside America made more difficult. But this, he thinks, is not a matter that will trouble the Yankees for many years to come. The development of their own great country will require all their energy, and make them practically independent of trade in other markets. He believes that the recent visit of so many English manufacturers to the United States will result in the establishing of works there by the aid of British capital, and that English workmen will be needed to make these works "go."

#### A ROLLING MILL MANAGER.

B. G. Wood, of the Wardsend Steel Company, says:

I spent most of my time in Pittsburgh amongst the rolling mills and forges. I discovered that they had better labor-saving appliances than we have. Where we use two pairs of rolls in rolling certain kinds of steel bars they use four. They believe in the expenditure of capital upon machinery rather than in paying large wages to workmen. The workmen, however, are far better paid than in England. One thing that struck me very forcibly was that in the rolling mills and forges which I visited none of them were in any way superior to those connected with the Sheffield Rolling Mills' Association. The work was not as well finished as that undertaken by the Sheffield rollers and tilters. In America larger quantities are turned out, but the quality of the work

is not equal to our Sheffield standard. The men I spoke to in the forges were receiving \$6 a day, and appeared to be quite as comfortable as the same class of workmen in England. They told me that their hours were from seven in the morning until five in the evening. The impression conveyed to my mind was that the hours of labor were not so long at Pittsburgh. Another very remarkable thing which struck me was the absence of old men about the works. Nearly all the heads of departments were young men under 40 years of age. One of the largest ironmasters in America states that he does not believe in keeping a manager who is over 40 years of age, as by that time he ought to have had enough brains to have made his fortune.

I was greatly surprised to find what a remarkably rich country is to be found in the neighborhood of Lake Superior. There are immense stores of copper, metal and iron ore. I saw some samples of copper taken from a mine in the Lake Superior district. The mine was owned by a company, which had a capital of £260,000. The shareholders in this concern got their capital back twice a year, and in addition all expenses in connection with the putting down of new machinery were paid out of revenue. This will give an idea concerning the enormous mineral resources of one portion of the States. In the States there is far more commercial vigor and enterprise than in Canada. We were traveling in a big forest for a whole week. In this forest wherever copper, nickel or iron ore has been struck, the trees have been cut down, and towns containing from 8000 to 10,000 inhabitants have sprung up in a short space of time. These towns are supplied with electric light, and many things which are as yet unknown in England.

I may say that I was pleased with the manner in which the Pittsburgh manufacturers rolled round bars for machinery cold. No turning was required, and the work was done to the thousandth part of an inch. It could not be done in England so well or so cheaply. The Pittsburgh people are considered to be ahead of us in the rolling of wire rods. I saw one wire rolling mill which turned out more wire rods in one day than are rolled in all the Sheffield wire mills combined. This applies, however, only to quantity, the quality of the rolling being considerably inferior to that of Sheffield. Cold rolling of round bars is a specialty with Pittsburgh firms. In nearly all the rolling mills in Pittsburgh the steel is heated by natural gas, or by gas similar to that used at the Kelham Rolling Mills.

**Drawbacks on Smelted Copper.**—Assistant Secretary Spaulding has informed a Baltimore firm that no drawback can be allowed on ingot copper produced from the smelting of a mixture of domestic and imported ores, if the domestic ores so used contain copper, as in that case it will be impossible to determine the quantity of the imported metal, but that if such domestic ores are wholly free from copper then the refined product may be treated as an article manufactured wholly from imported materials, and become entitled on exportation to drawback equal to the duty paid on the pure metal contained in the imported ore, less the legal deduction 1 per cent.

Under recent date the Union Storage Company of Pittsburgh issued the following announcement: On and after November 17, 1890, the principal office of this company will beat its new six-story brick warehouse, situated corner of Second avenue and Liberty street, Pittsburgh. About December 15, 1890, our new cold storage and freezing warehouse, corner First

avenue and West street, will be completed. In the cold storage and freezing warehouse we use mechanical refrigeration. Cars consigned to us via the Pennsylvania Railroad will be delivered on track inside our buildings. Shipments to our Twenty-fifth street warehouses should be made as heretofore, via Allegheny Valley Railroad, and to our Twenty-fifth street storage yard and oil storage house over the Allegheny Valley Railroad and Pittsburgh Junction Railroad.

#### The Capacity and Speed of Lake Steamers.

The immense expansion of lake commerce in the last decade has led to the equipment of great shipbuilding plants, and to the building of vessels of greater carrying capacity. Ten years ago there were but few vessels that could carry 2000 tons of freight. To-day there are dozens that carry 2500 tons on a 15 foot draft, and that could easily and safely carry 3000 tons were the rivers and harbors deepened to 18 feet. A number of records in the way of heavy loads have been broken this year. Heretofore the Onoko, an iron steamer launched at Cleveland in 1882, has been considered the greatest grain carrier on the lakes, having brought down 108,000 bushels of corn from Chicago to Buffalo, but two other vessels have beaten that the present season. The Emily P. Weed, the first steel steamer built at F. W. Wheeler's yard, at Bay City, Mich., and launched last spring, brought down 109,000 bushels, and the America, a few weeks later, beat this by bringing down 111,500 bushels, or 3122 net tons. This record was surpassed, however, in the ore trade. The steel steamer Pontiac, launched at Cleveland last season, brought down 3224 net tons of ore on a draft of 15 feet 11 inches, 5 inches less than that of the America. But even this record was smashed a few weeks later by the Maryland, a Detroit built steamship, which brought down 3640 net tons of ore on a draft of 16 feet. It is not likely that this will soon be surpassed, although the present fashion of building vessels with greater beam makes it certain that a few years at latest will see a number of such carriers on the lakes. When it is remembered that the Maryland's load is twice that carried by any vessel on the lakes in 1870 some idea of the developments of recent years can be gained.

The speed of lake vessels has increased with their size and carrying capacity. Five years ago there was not a 12 mile an hour freight boat on the lakes; now there are dozens of them. Many of the new steel steamers can make 15 miles an hour on a spurt, and a number of them will make a round trip from Cleveland to Escanaba or Marquette at a rate little, if any, under 14 miles. The record for speed, however, is held by the Union Line steel steamships Tioga and Owego, built in Buffalo in 1887 and 1888. The Owego has made the round trip from Buffalo to Chicago at the rate of 15 miles per hour, running light, going up and bringing down 85,000 bushels of corn. Some of the line steamers are managed almost with the regularity of express trains. For example, the Minnesota Steamship Company's steamers Mariska and Manola ran with such regularity this season that in making the trip from Two Harbors, Minn., to Cleveland they meet each other every trip on Lake St. Clair, and rarely more than a few miles from the same point.

The American war ship Alert is not invulnerable. When she was docked at San Francisco last week 20 feet of the wooden bottom dropped out, including the boiler supports.

### The Colombian Tariff.

The Department of State has received a translation of the tariff and the laws relating thereto of Colombia, in response to a communication forwarded to the United States Minister at Bogota that such information would be of value. The law relating to Custom Houses, Article 1, says the following duties shall be levied on foreign goods imported into the national territory. Passing over the intermediate schedules, the law provides for iron and steel duties as follows, per kilogram:

Iron not manufactured.....	.01
Rails, nails and other pieces for railways for the public use.....	.05
Rails not intended for the public use.....	.01
Boats, or sections of same.....	.02 1/2
Anchors and grapnels for small boats.....	.05
Bridges for public roads.....	.01
Bridges not intended for public roads.....	.05
Gasometers, apparatus tubes and lamps for public purposes.....	.01
Works intended for the construction or repair of public penitentiaries.....	.02 1/2
Telegraph wires for public uses.....	.01
Wire for private uses.....	.01
Steel wire for fencing and staples and other objects for mounting it.....	.02 1/2
Railing for ornamenting public buildings and squares.....	.01
Lightning rods.....	.01
Pipes for public drains and public fountains .....	.01
Light houses and towers for same.....	.01
Clocks for towers, including dials and bells.....	.02 1/2
Houses and galvanized tiles and peaks for covering same .....	.01
Balustrading for buildings, doors and windows, where it comes alone.....	.05
Fire engines .....	.01
Hydraulic pumps and engines, with pipes and other pieces belonging thereto.....	.05
Machinery for manufacturing and mining.....	.01
Machinery for agricultural purposes.....	.02 1/2
Machinery for the useful arts and industries.....	.03
Machinery not mentioned, the weight of which shall not exceed 1000 kg.....	.05
Machinery of every kind, the weight of which shall exceed 1000 kg.....	.05
Presses for printing, book binding and lithographing.....	.01
Engines for every class and capacity.....	.02 1/2
Tinned plates.....	.05
Monitors and large pipes for cleaning coffee, &c.....	.02 1/2
Large boilers.....	.05
Water tanks for drinking water.....	.01
Ore crushers.....	.05
Anvils and pulley blocks .....	.05
Plows.....	.02 1/2
Plates and rods not comprised in manufactured iron, bedsteads, large chairs, iron safes, nails, French nails, cooking utensils (with or without tin lining), smoothing irons and heavy tools for agricultural, quarrying and mining purposes, such as hoes, crowbars, coffee diggers, shovels, axes, large augers, spades, stone hammers, picks, drills and chopping knives and other knives for felling timber.....	.05
Tools for blacksmiths, stone masons, carpenters and bricklayers.....	.20
Lasts (for the useful arts).....	.20
Wire, rings, butts, hinges, screws and springs for furniture.....	.20
Furniture.....	.20
Fire-iron, wheels, axles, and cones for carts and carriages.....	.20
Levers, weights and steelyards : For weighing more than 100 kg.....	.10
For weighing up to 100 kg.....	.20
Curry combs and curry brushes.....	.20
Kitchen utensils and other objects tin ned inside and outside.....	.20
Knives for the useful arts, such as are used for bookbinding and shoemaking Cutlery not mentioned in other groups. Side arms, fire arms, &c., including guns, pocket knives, and scissors (fine and half fine, with handles of ivory, pearl, electroplate and britannia), gun tubes, beads (gilt or silvered), pencil cases, jewels, and all objects gilt or silvered or such as are known as German silver or electroplate (fine or half fine).....	.20
Steel in bars or rods for manufacturing purposes and drills.....	.40
Iron and steel made into forms not elsewhere designated.....	.40
Copper and brass.....	.10
Copper or brass, not manufactured, in bars or ingots.....	.10

Plates of every weight.....	.10
Pans or boilers, or articles of other class where the weight exceeds 25 kg.....	.20
Objects whose separate weight shall exceed 500 grams and not exceed 25 kg.....	.40
Objects whose separate weight shall not exceed 500 grams.....	.50
Jewelry, beads, tape, spangles, fringes, tubes, threads and other like objects, and electroplated objects and percussion caps.....	1.00
Statues for public buildings and squares.....	

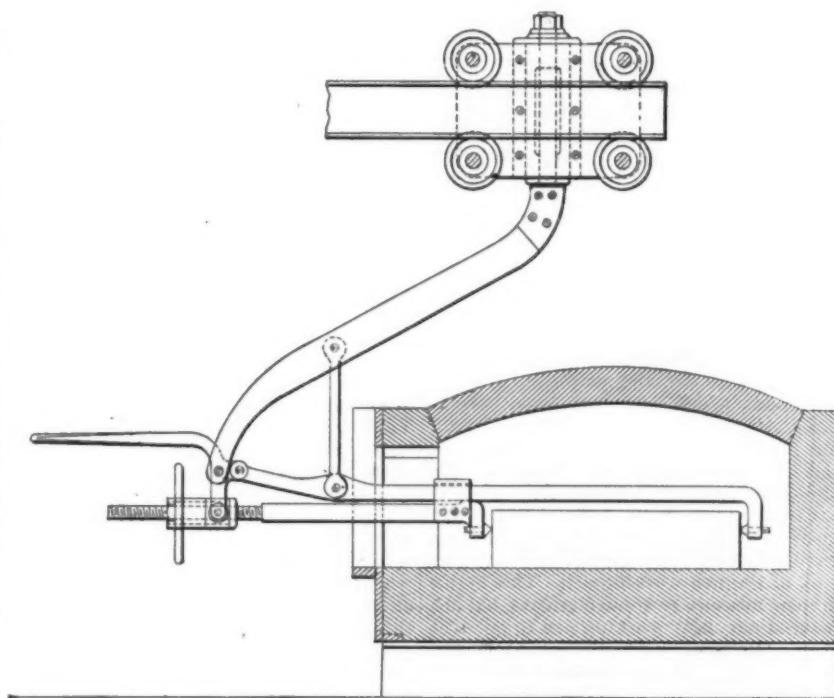
### Tin.

Ingots.....	.10
Plates and all other objects.....	.40
Dust and sheets.....	.50

### Lead.

Ingots for mines .....	.03 1/2
Sheets, tubes, and other articles whose weight shall exceed 5 kg, shot, type, and ingots not intended for mines....	.05
Toys in thin sheets.....	.70
Covers for bottles.....	.10
All other forms.....	.40

and the trolley enables the bars to be directed at right angles to the furnace door, even though the jib itself be at an acute angle thereto. Then by moving the trolley on the jib the bars are inserted into the furnace directly above the ingot, and the jib is then lowered, so as to cause the spikes at the ends of the bars to be opposite to the ends of the ingot, the ends of the bars being separated sufficiently to inclose the ingot by elevating the hand lever somewhat. When the bars are in position the hand lever is depressed thereby, bringing the spikes at the ends of the bars into contact with the ingot, and if the crane jib be elevated the weight of the ingot, acting on the bars, will so move the bell crank lever as to produce a relative motion of the bars in opposite directions, and to cause the spikes at their ends to firmly seize the metal piece, which, on being raised from the floor of the furnace,



THE FORTER APPARATUS FOR CHARGING HEATING FURNACES.

### Zinc.

Zinc, unmanufactured, in sheets or plates, including that intended for roofing and in tubes.....	.05
Manufactured in any other form.....	.40

### Apparatus for Charging Heating Furnaces.

A glance at the accompanying drawing will make plain the construction of this apparatus. Mounted to roll on the jib of a crane is a trolley to which is swiveled the upper end of a rod shaped as shown in the cut. The gripping mechanism consists of two bars formed with spikes adapted to grip the ingot. These bars are connected by a coupling box, through which the upper bar may be moved longitudinally.

The operation of this device, which is the invention of Samuel Forter of Pittsburgh, Pa., is as follows:

If it be desired to remove an ingot or bloom from the heating furnace, the lower bar is moved by means of the hand wheel so as to make the distance between the spikes at the ends of the bars a little greater than the length of the ingot. The crane of which the jib forms part and the trolley are moved so as to direct the bars toward the door of the furnace, and the swiveled connection between the rod

may be carried to any place within the sweep of the crane. When the jib is lowered to deposit the ingot on the floor or other support, the relief of the weight of the metal from the bars will produce a relative motion of the bars, so as to release them from the ingot and permit them to be removed.

The rearward extension of the supporting rod and its swiveled connection with the trolley permit the apparatus to be introduced into the furnace door, whatever be the angle of the jib relatively thereto and also cause the device to be properly balanced relatively to its support from the jib, since the center of gravity of the device, when carrying the ingot, is substantially in a vertical line with the axis of the bar in the trolley.

John W. Nesmith of Denver addressed a meeting of business men of that city on Denver's interest in iron and steel manufacturers. Mr. Nesmith claims that Eastern competition can be met and a large local business be built up. Past experience certainly does not justify that claim.

The advisory board of engineers in Philadelphia recommend to the City Councils the construction of elevated railroads for rapid transit, and the abolition of all grade crossings on steam roads.

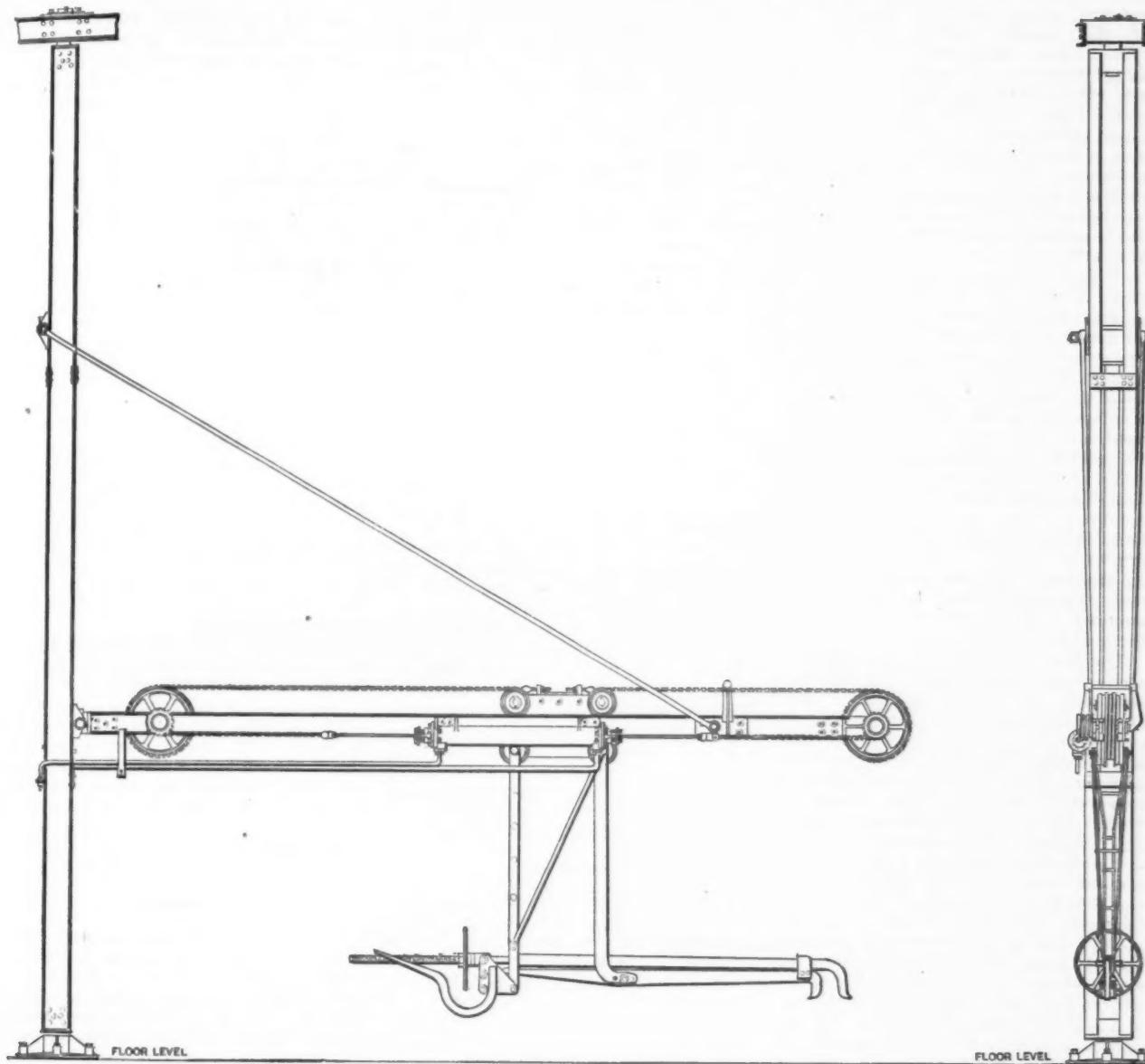
**Apparatus for Handling Ingots.**

The accompanying drawing shows an appliance intended for use principally in charging and removing ingots into and from furnaces. It is the invention of Julian Kennedy of Pittsburgh, Pa., and Samuel Forter of Latrobe, Pa. The drawing shows it as in operation at the Latrobe Steel Works. The apparatus is extremely simple in construction and easy of operation. Depending from trolleys arranged to move to and fro on the jib

deposited, the mere act of resting the bloom on the ground will cause the gripping jaws to release it. The gripping device is entirely automatic in its action, both in its first action of seizing the bloom and afterward of releasing it. By means of the hand wheel the gripping jaws may be brought near together or far apart, to suit ingots of any size. It is evident that the bars can be so formed as to grip either the exterior of a solid piece or the interior of a hollow piece, like a tire or the sides of a solid piece, and under all modifica-

**Howitzer Experiments.**

Messrs. Krupp, Essen, have issued a report on the trials of a heavy howitzer fired at high angles against targets which represented different parts of the armored steel deck of a modern protected cruiser. The experiments are continuations of a series which was begun so long ago as 1879. In that year Krupp fired a 28 cm. (11.02 inch) howitzer at a target representing the 3-inch protective deck of the then new British battleship *Inflexible*.



Side Elevation.

End Elevation.

**THE KENNEDY-FORTER APPARATUS FOR HANDLING INGOTS.**

of a crane are two rods which carry the gripping mechanism at their lower extremities. This mechanism consists of two horizontally placed bars whose extremities at one side are bent to a right angle to form points. The opposite end of the upper bar is threaded, and on this threaded portion is fitted a nut operated by a hand wheel, by the turning of which the spiked ends of the bars may be adjusted to or from each other. Now, the apparatus is so arranged that when the jib is raised the spikes will firmly grasp the bloom, which will be lifted by the upward movement of the jib. The bloom may then be withdrawn from the furnace by moving the trolley and the jib in the usual way. When the load has been brought to the place on which it is to be

tions preserve the admirable features mentioned above.

On Saturday, the 22d ult., the new steamer *Opaleechee*, built by A. J. Sweeney & Sons of Wheeling, W. Va., was launched at that place. This is a composite boat, having a steel frame covered with wood, and is to be run on the Chattahoochee River as a feeder to the Savannah, Florida and Western Railroad. The boat is 135 feet long, 28 feet beam, a 26-foot floor, and 4½ feet in the clear at the lowest depth. Her carrying capacity will be 700 bales of cotton, and she will have cabin room for 80 passengers, besides her rooms for the boat officers. She is expected to have a speed of about 12 miles an hour.

This target was struck by five out of ten rounds at a range of 7327 yards, or considerably over four miles; and it was shown that, at a range of six miles, all projectiles might be made to fall within an area of 390 feet by 161 feet—an area that is about as long and about twice as broad as that of a first-class cruiser's deck. At that range an armor piercing steel shell of 562 pounds, with a striking velocity of only 442.9 foot-seconds, shattered the plate, and remained itself intact; and a chilled iron shell of 506 pounds, with a striking velocity of 574 foot-seconds, descending at an angle of 60° with the surface of the target, successfully penetrated the plate. The latest experiments, which were conducted on the range at

Meppen, were made with a howitzer of a new and improved type, of 28.55 cm. (11.27 inches) caliber, and of a length of 11.6 calibers, or 10 feet 10.7 inches. The weight of the weapon without the mounting was 10,998 kg., or nearly 11 tons, and that of the mounting nearly 14 tons, while the weight of the bed on which the mounting was placed was about 45 tons. The projectiles used were armor piercing shells of 512 pounds, 661 pounds and 936 pounds, and steel armour piercing shells of 661 pounds. The charges used were various. Those up to 40.7 pound in weight were of pebble powder; those above, and including the extreme charge of 57.3 pounds, were of the powder known as prismatic c/82. The horizontal armor deck target measured 52 feet by 13 feet, and was composed of four superimposed steel plates riveted together, the three upper layers having, unitedly, a thickness of 76 mm. (2.99 inches), and the lowest layer a thickness of 13 mm. (0.51 inch). The total thickness was, therefore, 3 $\frac{1}{4}$  inches. This was backed with iron ribs and wood, and firmly supported at a height of a little over 5 feet from the ground. All the plates were specially selected, and were of the finest quality. It may be noted that the ordinary thickness of deck armor in cruisers does not exceed 3 inches, and that very few vessels of the class possess better protection. The chief exceptions are our cruisers of the Blake type, with a maximum of 6 inches, and of the Centaur type, with a maximum of 5 inches; the American ships Philadelphia and Baltimore, with a maximum of 4 inches; the Chinese cruisers Chih-Yuen and Ching-Yuen, with a maximum of 4 inches, and two or three of the latest Spanish vessels. Nearly every other cruiser, and nearly every battleship, has an armored deck thickness of 3 inches or less. The most interesting trials with this armored deck target resulted from the firing of two shots.

The first of these shots was one of a series of 10. The elevation for the series was 45°, the projectile was a steel armor piercing shell of 661 pounds, the charge was 25 pounds of pebble powder, and the range was 3870 yards, or nearly 2 $\frac{1}{2}$  miles. The greatest longitudinal deviation was 95 feet, the greatest lateral deviation was 27 feet. In this series one hit was obtained. There was a longitudinal deviation of 6 $\frac{1}{2}$  feet, with a lateral deviation of 19 inches. The striking velocity was 610 foot-seconds, and the angle of incidence was 46 $\frac{1}{2}$ °. The target was pierced, the supports were bent considerably, 10 rivets were loosened, the plates were depressed about 1 inch in the center, and the projectile was found unharmed at a depth of 5 feet in the earth. The second of the shots was one of a series of 16. The elevation for this series was 65°, the projectile was as before, the charge was 33.8 pounds of pebble powder, and the range was again 3870 yards. The greatest longitudinal deviation was 105 feet, the greatest lateral deviation was 88 feet, and one hit was obtained, the longitudinal deviation of which was 5 feet, and the lateral deviation 20 inches. The striking velocity was 751 foot-seconds, and the angle of incidence about 66°. Once more the target was pierced, the center was depressed nearly 2 inches, 13 rivets were displaced, the supports were seriously bent, and the projectile was found unharmed 15 feet to the rear of the hole in the target and 4 feet deep in the earth.

Experiments were also tried against steel targets inclined at an angle of 45°, and placed at a distance of 165 feet from the howitzer. The horizontal target had represented the summit of the curved deck of a cruiser; the inclined target represented the slopes of that deck, and two of them were experimented with. One was 114 mm. (4.48 inches) thick, and

measured 8 feet by 6 $\frac{1}{2}$  feet; the other was 89 mm. (3.5 inches) thick, and measured 6 $\frac{1}{2}$  feet each way. Both were well backed with pine and firmly supported, and both were easily pierced by the projectiles from the new howitzer. Finally experiments were conducted in order to obtain full ballistic and other details concerning the weapon, and to these ends 253 rounds were fired. The following are particulars of three representative rounds:

Powder .....	{ 40.7 lb	40.7 lb	57.3 lb
Projectile.....	pebble.	prism.	prism.
Muzzle velocity...	661 lb	661 lb	661 lb
Gas pressure, per square inch.....	857 f.s.	771 f.s.	1,020 f.s.

Gas pressure, per square inch..... 14.9 tons 9.5 tons 14.4 tons.

The shots which were fired at the horizontal target were the most interesting. Of the two series of 26 in all, 20 projectiles would have fallen upon the target if, instead of measuring what it did, it had been of the shape and superficies of, say, the Centaur's deck. Of course the target was fixed, and, of course, in war time men-of-war would generally, if not always, be moving under steam when engaging shore batteries. But, looking to the accuracy of the fire at Meppen, it seems probable that it would not be very difficult for good gunners with a battery of the new howitzers to make occasional hits, even on moving ships, at a range of 2 $\frac{1}{2}$  miles, and if hits were made the results to ironclads as well as to cruisers would, it may be fairly assumed, be most disastrous. The projectile would pierce a still thicker deck than that of the Blake, and would then retain sufficient velocity to carry itself through the bottom of the ship. And if it were a loaded shell with a bursting charge of from 8 pounds to 20 pounds of powder the catastrophe would be yet more terrible. Contact with the vessel's upper works might, in the case of a very sensitive shell, cause explosion above the armored deck; but with a percussion fuse of slightly delayed action the explosion might with considerable certainty, be arranged to take place below the deck and in the midst of the very vitals of the ship. For use, therefore, from fixed positions on shore, especially in connection with such a device as the Watkin position finder, the howitzer seems to have a promising career before it. It will be observed that the experiments contain lessons equally instructive to the naval constructor and gunnery officers.

**A New Welder.**—The Thomson-Houston Welding Company have just perfected a machine which will have a large sale as a welder. It is so built that by means of a series of interchangeable clamps it will be adapted to a great variety of work. It can therefore be used by many small manufacturers who could not afford to put in large plants. It will be especially useful in machine shops, repair shops, railway car shops, carriage and wagon works, shipyards, or anywhere where welding of a greater variety and quantity is now done by the old forge method. A recently perfected machine is for welding axes, the dull iron or steel butts being welded to the steel blade. This class of work will demand several hundred thousand welds yearly. The Weed Sewing Machine Company of Hartford, Conn., recently ordered another plant for welding bicycle tires. The Edison Company have just ordered three more machines for their Schenectady factories. The Okonite Company of Passaic, N. J., which now have three machines in operation, have ordered three more. The Welding Company now have three months' work ahead.

The Cable Tramway Company, of Providence, R. I., have had on exhibition the past week a new grip car, the first of six intended for extra service next summer.

The entire work was designed by Superintendent M. H. Bondson, in the company's own works. The truck is built entirely of iron and steel, and so framed as better to endure the strains of hill work than those now used. When completed the new car will seat 22 passengers, though only 18 inches longer than the others. The dome light, gong, stanchion bolts, dasher, rails, chains and roof drain pipes are all nickel plated, making an elegant and durable finish.

#### A Continuous Rail.

At the last meeting of the Engineers' Club of Philadelphia, R. Taylor Gleaves presented a description of continuous rails for railways, which are carried upon ordinary ties of wood or iron weighted down with a covering of earth, gravel or stone, so that they cannot easily move. The spikes are not driven home by  $\frac{1}{2}$  of an inch, so that undulations may take place in the rail without disturbing either spikes or ties, and arrangements resembling turnouts are put in at fixed points, such as frogs, and at the foot of heavy grades, for the purpose of admitting of longitudinal motion. The author explains how the rails are united so as to make them continuous. In the case he notes the rails were riveted together with fish plates. He says that while the riveting was in progress the expansion gave some trouble, but since it has been completed there has not been the slightest buckling or any perceptible pulling in on the curve. The ties are covered with red clay containing some loam, and, to prevent dust, part of the track was turfed and grass seed sown over the remainder, so that now he says "instead of a wrench the watchman pushes a mower, and the road bed looks like a pretty green lawn with two metal ribbons laid across it."

Speaking of the doubts which had been expressed as to the utility of this arrangement, the author says that it is a fact, "that there is in Virginia a section of track laid with rails three miles long, that it has been in service since June, 1889, that it has not been surfaced or lined since put down, that the only expense of maintaining it has been the watchman, that engines weighing 104,000 pounds are frequently run over it at a speed of 50 miles per hour, that it is simply ballasted with earth."

Organizing trade teaching is advocated with much force by Joseph M. Wilson, president of the Franklin Institute, of Philadelphia. In his address on "Trade Schools," which closes in the October number of the Institute Journal, he makes the suggestion that the various institutions giving technical education in that city "form themselves into an organization, and do work such as is being done by the City and Guilds of London Institute and the Department of Science and Art in Great Britain to advance the cause of trade and technical education." Mr. Wilson names the Philadelphia Exchange, Franklin Institute, Art Museum and kindred organizations. The technical training given by the City Industrial Art School and the School of Manual Training is of the first rank and importance within its field. In addition, the Drexel School will before long be in this great field with resources and endowment equaling, if it does not surpass, all the rest of the institutions devoted to this work put together. Besides all this, the entire public school system of Philadelphia is rapidly introducing the rudiments of certain branches of technical training, and when its system is complete the pupils will receive a training in hand and eye given in few technical schools twenty-five years ago.

**The Crescent Lathe and Planer Tool.**

Frassé & Co. of 92 Park row, New York, are introducing the lathe and planer tool herewith illustrated. Fig. 1 represents the sliding rest or holder with the cap removed, showing the position of the cutter and the way it is held in place. The other part of the holder is shown in Fig. 2. The holder, which incloses the cutter, gives a bearing the full length of the cutter, and holds the cutter against chatter or slipping. The claims are made that the tool is stronger than the common hand-forged tools, inasmuch as the cutter is solidly inclosed within the two clamping surfaces, and at the same time a difference in clearance may be obtained by lowering or raising the cutter. The point is made that the material used is machinery steel for the holder and high grade

divided into 4000 shares of the par value of \$50 each, all stock being fully paid and non-assessable.

The stockholders' annual meeting was held at the office of the works recently. William McDaniel acted as chairman and J. Clinton Sellers as secretary. The election resulted: S. D. Hawley, of Philadelphia; Elliston M. Daniels, Addison R. Wright, George J. Humbert, of Norristown; William McDaniel, L. K. Passmore, C. H. Miller, of Philadelphia; Maurice B. Pratt of West Chester; Charles C. Highley of Malvern, and H. H. Haines of Rising Sun, Md.; Lewis T. Brooke, Radnor. Immediately after the result had been announced the stockholders' meeting adjourned, and the new board met for organization. S. D. Hawley was re-elected president, and other elections were postponed until the next meeting, the present

**Tribute to the Deceased Members of the Iron and Steel Institute.**

At the request of a member of the Council of the Iron and Steel Institute we print the following as an addition to our report of the proceedings:

On the second day of the international meeting of the German, American and British metallurgists, recently held at Pittsburgh, Herr Alexander Thielen of Ruhrort being in the chair, occasion was taken to bring forward an interesting resolution, expressive of the value attached by the living members of the profession to the work of their deceased colleagues.

The chairman said he wished to submit a resolution that they should send a message to the nearest relatives in memory to those gentlemen who had left them, Professor Grunor, Mr. Holley, Dr. Percy, Sir William Siemens, Sidney Gilchrist Thomas, and Mr. Adamson, stating that that meeting held fresh in its memory the good work which they had accomplished.

Mr. Gilchrist, in seconding the resolution, said he wished to tender to Sir James Kitson his hearty thanks for permitting him to second Herr Thielen's proposition. The name of Grunor would be revered by metallurgists for all time, for in his writings they found great truths clearly expressed; as an example of this he had only to remind them that in Grunor's writings they found, so long ago as 1856, that he clearly stated why phosphorus was not removed in the Bessemer and Siemens furnaces; Dr. Percy, their grand old English metallurgist, who was one of the first, if not the first, to codify their metallurgical knowledge; Alexander L. Holley, their great steel engineer; he it was who by his visits to European steel works and by his remarkable power of devising mechanical improvements where required, and of seeing where such improvements were necessary, had a large share, if not the largest share, in enabling their cousins, the Americans, to beat them in the output from steel plant of the same furnace capacity, and that, too, without any sacrifice of quality; Sir William Siemens, one of the most versatile inventors the world had seen, and who, among his many achievements, would always be remembered by the open hearth or Siemens-Martin process for making steel, and by his regenerative furnace.

Sidney Gilchrist Thomas, who independently discovered how steel could be produced in the Bessemer and Siemens furnaces from phosphoric pig iron, and who, in conjunction with his cousin, Percy C. Gilchrist, worked out the commercial part of the process, aided by all engineers and others connected with the various works at which the process was adopted, prominent among these being Messrs. Edward Martin, E. Windsor Richards, Henri Schneider, R. Pink, Joseph Massenez, Arthur Cooper, Edward Riley, Gustav Pastor, Paul Kupelwieser, and the Aciéries d'Angleur, and who, also in conjunction with his cousin, watched over and extended the use of the process known as the basic or Thomas-Gilchrist process; Daniel Adamson, one of the pioneers in the use of steel for boilers, and who, like Holley, did much to promote and had dear at heart the visit they were paying their cousins across the water. The motion was carried unanimously.

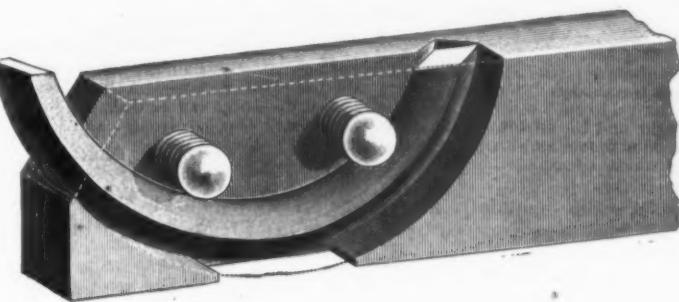


Fig. 1.—Sliding Rest or Holder, with Cap Removed.



Fig. 2.—The Cap.

#### THE CRESCENT LATHE AND PLANER TOOL.

tool steel for the cutters, the screws being case hardened.

**The Norristown Steel Company.**

The Norristown Steel Company are a new concern, located at Norristown, Pa. The products of the plant will be steel castings of all descriptions, made from open hearth steel. In addition, however, it is planned to have a rolling mill for blooms, billets, &c., and ample power in both engines and boilers has been provided.

The buildings now in course of erection and nearing completion are all so located as to be added to conveniently in the event of necessity for enlargement of any of them, and may be briefly described thus: The boiler, pump and gas house, 40 x 136 feet, containing four boilers, 1500 horse-power, six gas producers, pumps, and all other necessary appurtenances. The steel casting department building, 90 x 160 feet, containing two modern 15-ton open hearth furnaces, with weekly capacity of 500 tons, steam traveling crane, and all the necessary appliances for economic working. The rolling mill department building, 80 x 180 feet, containing one pair reversible engines, 1500 horse-power, located to operate 2 mills if desired. The machine shop building, 40 x 100 feet, finishing room and general work. The chartered capital of the company is \$200,000,

officials to perform the duties meanwhile. George J. Humbert, formerly superintendent of the Chester Rolling Mills, is the manager of the Norristown Steel Company. Mr. Humbert was formerly connected with the Homestead Steel Works and Schoenberger & Co., Pittsburgh.

The buildings are of the most substantial character, and the plant is most of it already on the ground, including the steam traveling crane of 20 tons capacity, which arrived Tuesday morning. It is intended to erect two 15-ton open hearth furnaces of the most approved pattern, and the plant will be equipped with all the latest modern improvements. It is expected to be able to cast a heat by March 1, 1891, and to get the works into complete operation by May 1.

The enterprise has now no connection with the Continental or the Pennsylvania Rolled Steel Car Wheel Companies, the two latter having been merged into the Norristown Steel Company. The Continental Car Wheel Company withdrew, and the Steel Company, having secured its own charter, is an entirely independent corporation. The Pennsylvania Rolled Steel Car Wheel Company has gone out of existence, the property belonging to it having been purchased by the Norristown Steel Company, the stockholders taking stock in the steel company in proportion to their original holdings.

Over 123,000 head of cattle were shipped from Montreal to England during the season just closed, showing a large increase, which is partly due to the division of traffic from Buffalo under the McKinley bill. It is said that money was lost from the beginning of shipments, except during a part of September.

## HEATED STEEL.

### Influence of High Temperatures on the Mechanical Properties of Mild Steel.\*

BY A. MARTENS, CHARLOTTENBURG.

In 1886 the Verein zur Beförderung des Gewerbeleisses and the Verein Deutscher Eisenhüttenleute proposed a series of tests on the influence of temperature on steel of various degrees of hardness. Both these societies appointed a commission, three members from each society, to plan the execution of the project. Their object was to secure more reliable information on the influence of heat on steel under strain. Although investigations had been made from time to time on the subject and some valuable data had been accumulated, it was thought, nevertheless, that the knowledge on that point was still insufficient. To the designer of structures which are subject to variable or high temperatures, or both, it is a matter of vital importance to know their effects on the metal used. The following points, as a basis for the experiments, were agreed upon:

1. To use steel of 52,000, 60,000, 68,000 and 77,000 pounds tensile strength per square inch respectively. Test pieces to be carefully annealed, the first class to be of the quality of rivet steel.

3. To have, as much as possible, only carbon the hardening element; the other elements to be present in small and uniform quantities

test pieces were hammered down from ingots 10 inches square to billets 4½ inches square, and then rolled down to 1-inch round bars.

Table I.—Results of Tests of Experimental Steel at Ordinary Temperature. Average of from 3 to 7 Tests.

Class of metal.	Proport'nal limit.		Limit of stretch.		Breaking strength	Elongation.		Contraction.	Remarks.
	Load applied.	Elong'n. Per cent.	Load applied.	Elong'n. Per cent.		In 4 inches. Per cent.	In 8 inches. Per cent.		
I...	23,320	0.080	38,700	0.124	58,300	32.7	26.9	48.5	
II...	28,440	0.095	39,900	0.140	68,250	31.3	26.4	49.0	
III...	27,300	0.092	43,370	0.145	75,000	34.3	28.6	53.3	
IV...	31,850	0.104	41,940	0.135	68,670	34.4	27.8	55.3	
I...	23,460	0.079	31,400	0.107	54,600	37.2	30.4	58.6	
II...	24,300	0.082	36,540	0.115	61,940	34.6	28.9	48.7	
III...	36,680	0.124	39,670	0.124	66,800	36.7	28.6	61.5	Annealed.
IV...	23,740	0.079	36,200	0.113	62,400	37.2	29.6	59.8	

Note.—German physicists assume four periods or stages during a test. Proportional or elastic limit is considered that point where load and resulting effect on test piece or structure are proportional to each other. Limit of stretch is the point where flow and permanent distortion begin and the effects on the structure become disproportionate to the load applied, maximum or ultimate and breaking load or strength.

4. To make the material for the test pieces of the same ingot; or at least of the same heat.

5. To roll test pieces down to 1½ inches in diameter and to make them 32 inches long.

Tests were made of the material at the ordinary temperature of the room, with the following results:

It was found that Class IV did not meet specifications, and it was therefore excluded from future tests. Test pieces

Table II.—Average Results of Temperature Tests.

Class of material.	Temperature.	Taken from measurements.								Taken from diagrams.								At fracture.			Remarks.	
		At tempera-ture of room.		At experimental temperature.						At experimental tem-perature.		At fracture.						At fracture.				
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19		
	Degrees Celsius.	Per cent.	Million pounds.	Per cent.	Million pounds.	Pounds.	Per cent.	Pounds.	Per cent.	Pounds.	Per cent.	Elastic limit.	Maxi-mum.	Breaking point.	Maxi-mum.	Breaking point.	in 4 inches.	in 8 inches.	Contraction.	Appearance of fractures.		
I.	-20	0.0147	30,746,000	0.0146	30,740,000	17,490	35.120	0.058	0.102	34,960	58,480	45,500	24.0	30.7	38.0	31.9	55.8			Dull gray, short fibered, cup shaped.		
	+20	0.0151	29,490,000	0.0151	29,490,000	23,460	31.280	0.079	0.107	32,130	54,500	41,080	21.5	28.8	37.2	30.4	58.6			Dull gray, short fibered, large cup.		
	100	0.0150	28,861,000	0.0151	28,280,000	20,760	28,440	0.073	0.102	29,000	55,500	42,660	12.8	16.9	21.1	14.1	50.9			Irregular coarse grain.		
	200	0.0152	29,750,000	0.058	27,720,000	25,760	28,290	0.093	0.105	28,000	91,500	61,850	12.9	16.8	19.6	15.8	44.5			Irregular cups.		
	400	0.0154	29,430,000	0.068	26,730,000	14,640	22,180	0.055	0.095	23,030	68,410	64,000	14.2	19.6	23.0	20.0	22.9			Nearly pointed.		
	500	0.0147	30,000,000	0.0205	21,470,000	5,972	.....	(0.042)	.....	18,770	48,490	31,850	10.6	29.4	50.5	35.0	57.5					
	600	0.0146	29,360,000	0.0239	19,050,000	2,844	4,550	(0.015)	0.032	15,210	27,440	10,660	8.6	42.9	65.6	50.3	79.6					
										8,100	45,210	1,840	17.0	50.8	97.3	76.7	90.5					
II.	-20	0.0152	29,700,000	0.0151	29,860,000	22,466	38,100	0.075	0.138	38,240	66,400	56,160	20.8	25.3	31.7	26.8	48.7			Dull, short fibered and fine grain.		
	+20	0.0151	29,420,000	0.0151	29,860,000	24,310	36,970	0.162	0.115	34,270	62,100	51,190	22.4	28.9	34.6	28.9	48.7			Dull, short fibered, large cup.		
	100	0.0153	29,4,000,000	0.0154	29,430,000	23,740	34,980	0.081	0.110	33,700	63,940	43,180	10.2	14.8	22.9	15.6	43.7			Irregular, flat cup.		
	200	0.0152	29,430,000	0.0161	27,720,000	26,870	32,560	0.066	0.102	33,130	77,920	71,660	11.3	14.9	18.5	14.8	33.2			Cup, irregular.		
	300	0.0151	29,860,000	0.0162	27,500,000	18,000	.....	0.066	.....	29,719	75,220	71,800	15.3	18.8	24.8	22.6	37.6			Nearly pointed.		
	400	0.0149	30,000,000	0.0172	26,020,000	15,780	20,190	0.061	0.071	23,030	61,420	46,920	14.6	25.2	36.7	29.5	50.6					
	500	0.0152	29,980,000	0.0208	21,500,000	.....	.....	.....	.....	18,628	32,120	6,820	6.5	34.1	56.8	44.9	79.5					
	600	0.0149	29,700,000	0.0263	17,060,000	.....	.....	.....	.....	10,230	15,490	1,137	4.8	58.3	96.6	67.8	96.0					
III.	-20	0.0150	30,000,000	0.0149	29,960,000	25,160	40,520	0.074	0.135	39,980	71,240	54,800	20	25.7	33.8	26.9	57.5			Dull, short fibered.		
	+20	0.0155	29,570,000	0.0155	29,000,000	36,680	41,000	0.124	0.124	38,240	66,300	49,000	20.6	28.6	36.7	28.6	61.5			Dull, short fibered, cup.		
	100	0.0152	29,000,000	0.0155	29,000,000	31,140	37,110	0.107	0.122	36,970	66,400	51,200	13.7	16.9	25.5	18.6	55.4			Dull, short fibered, large cup.		
	200	0.0151	29,700,000	0.0158	27,290,000	25,000	26,260	0.089	0.134	31,280	63,560	60,570	5.0	8.4	5.1	8.4	56.3			Broke in lower fillet, coarse, irregular.		
	300	0.0150	30,140,000	0.0163	27,160,000	23,880	30,280	0.088	0.106	24,880	61,400	51,470	13.7	28.3	39.1	30.9	44.5			Irregular.		
	400	0.0149	39,860,000	0.0171	26,000,000	.....	22,320	.....	0.099	.....	21,400	37,800	18,480	9.9	37.6	57.4	44.8	74.1			Distinct cup.	
	50	0.0149	30,000,000	0.0202	21,890,000	.....	17,060	.....	.....	10,650	19,860	3,120	6.2	40.6	80.5	56.9	86.3			Indistinct cup.		

2. To leave it to the steel works to produce the desired material, according to their own judgment, with the understanding, however, that they must furnish a complete history of its manufacture.

\* Abstract of the report printed in the *Mittheilungen aus den Königlichen Technischen Versuchsanstalten*. VIII. 1890. 4.

6. To carefully and uniformly anneal test pieces at the Royal Test Department.

The Hörde Steel Works, in Hörde, and the Union Steel Works, in Dortmund, undertook to furnish the material for the experiments, and both these works agreed among themselves upon a uniform plan for producing the material. Subsequently,

were shaped as shown in sketch (Fig. 1) on following page.

#### METHOD OF EXPERIMENTING.

The apparatus for making the temperature tests is described as follows, Fig. 2 showing the construction: The test piece was surrounded by a vessel or drum, 4

inches inside diameter, which was filled by a bath of paraffine or molten lead (or lead and zinc)\* according to requirements. This vessel or drum was inclosed by a iron jacket with suitable openings to introduce the gas flame, which was generated by two Soewers' gas blowers. Suitable slides facilitated the regulating of the arrangement for carrying away the waste gases. The blowers were driven by water power and produced a flame 4½ inches in width. Test pieces and drum containing the bath were hung on ball joints in the testing

Measuring the elasticity of the material while in the hot bath presented considerable difficulties, because the cylindrical part of the test piece which was to be measured was not directly accessible. Though the measuring apparatus (shown in Figs. 4 to 9) was clamped so as to free it as much as possible from the influence of heat, yet it was thought advisable to make certain parts of the apparatus of the same material as the test material was composed of, to secure a uniform co-efficient of expansion. Elon-

gation on that basis. After this was done the drum was fastened to the test piece, then filled with paraffine of metal and the gas blowers set in motion.

The fine measuring instruments were taken off on reaching the limit of stretch, and the subsequent phenomena recorded by the automatic recording apparatus. At the beginning and close of the test the position of the piston of the machine was noted, to ascertain the total extension of the test piece. The tests made at a temperature of 20° C. were conducted in exactly the same manner.

In Table II is given a summary of the results of tests. Values given in parentheses are doubtful. At 400° C. proportionality between load and extension becomes very questionable, at 500° C. and 600° C. it seems to have disappeared entirely, though this question cannot be considered definitely settled until more extended experiments of the same kind have been made. At such high temperatures the manipulation of the fine measuring instruments becomes quite difficult, and there is liability to errors.

Table II and Figs. 10 and 11 present some very interesting, and for the practical man very important figures. It will be seen how, beginning after -20°, strength and elongation decrease, to rise again between 200° and 300° to their highest values. This increase is noticeable in all three classes or grades of hardness of the material, as shown below.

Table III.—Increase of Strength at 300°.

Class.	Maximum load. Per cent.	Breaking load. Per cent.
I.....	34	62
II.....	27	45
III.....	25	50

The diagrams in Figs. 10 and 11 show this phenomenon very plainly. It is noticeable that metal of superior strength, when cold, retained its higher qualities at high temperatures. In Figs. 10 and 11 it will be seen how closely the lines representing the three classes of material run together up to a temperature of about 300° C.; then they diverge.

The proportion of strength and elongation to one another at different temperatures is given in tables IV and V.

Table IV.

Material.	Proportion of maximum strength to breaking strength at degrees Celsius.							
	-20	+20	100	200	300	400	500	600
I.....	70	75	77	86	96	66	39	12
II.....	85	82	85	92	96	76	48	7
III.....	77	74	79	91	96	84	49	16

Table V.

Material.	Proportion of elongation at maximum strength to elongation at breaking strength.							
	-20	+20	100	200	300	400	500	600
I.....	78	76	76	79	73	36	20	28
II.....	75	79	68	76	81	58	19	8
III.....	78	72	81	74	59	48	26	15

More illustrative of the influence of temperature on the strength of metals than the above figures are the following tension diagrams, Fig. 12. They characterize very

machine. The temperature, up to 400° C., was at first measured with mercury thermometers filled with nitrogen. Later on air thermometers were used.

The cold tests, at a temperature of -20° C., were made in a zinc vessel, which was also suspended on ball joints in the machine, the construction being shown in Fig. 3. The inner space, as well as the annular space between the two walls, was filled with a mixture of fine cut ice and rock salt. This arrangement permitted the maintaining of nearly -20° C. for a considerable time. To prevent rapid loss of temperature the drum containing the cold mixture was also jacketed with a lining of asbestos and sawdust.

The machine was operated by either the automatic weighing apparatus on the left

gation, also, could not be measured directly, but was found by measuring the abscissae of the automatic diagrams obtained. A scale had been attached to the piston of the testing machine to control the measurement and speed of flowing of the metal after maximum strength was reached. As a check on these measurements a point had been attached to the hydraulic piston of the machine, by which the measurements were increased 14 times. It is a rule in the department to regulate the speed of the piston of the machine so that during the flow of the metal 1 per cent. of the stretch of the test piece is recorded per minute.

When testing under ordinary conditions elongation is measured at the beginning of flow of the metal—that is, at the point

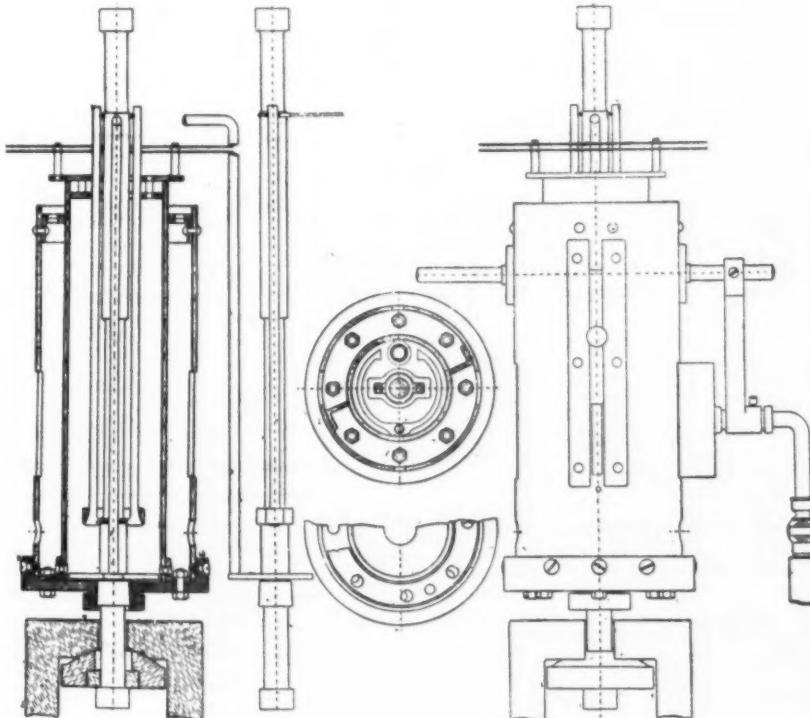


Fig. 2.—Apparatus for Heating Test Pieces.

side of the machine, or on its right side by placing weights on the scale as the stress increased. The stress is transmitted by the test piece pressing on the diaphragm of the weighing cylinder. The hydrostatic pressure in the cylinder is regulated by a column of mercury in such a manner as to counterbalance the stress exerted by the test piece. As soon as the stress disturbs the perfect balance an electric arrangement comes into play which raises or lowers the mercury column to counterbalance the disturbing stress.

\* It was found that no lead was taken up by the steel in its heated condition.

of maximum strength—and the piece is then broken without further attention being paid to the phenomena of decreasing strength, &c. On account of the importance of the matter a departure from the usual routine was made in the present case. Every test piece which was intended for the high temperature test was tested at the ordinary temperature of the room for its elastic behavior. Each piece was subjected to repeated stresses in the machine, by loading and unloading, up to about 600 pounds, in order to ascertain the elongation for 1 ton of load accurately, and to calculate the modulus of

distinctly the important changes taking place in the physical condition of metals at an increasing heat.

It will be noticed that the line at point *s*, which for a short distance runs parallel

At  $+20^{\circ}$  in the middle. At  $100^{\circ}$  and  $200^{\circ}$  they again broke near the lower fillet. At  $300^{\circ}$  Class I and II test pieces broke toward the upper end, while those of Class III broke in the lower fillet. At

difference of temperature in the ends of test pieces at different temperatures. The difficulties with which such tests are conducted make it almost impossible to maintain exactly the same temperature at both ends of the test piece. The effects of the unavoidable imperfections of arrangement are quickly observable, since but a small difference in temperature at one or the other end is sufficient to cause fracture at the point of higher temperature. Only Class III is a notable exception, since at  $300^{\circ}$  the test pieces of this class all broke in the colder portion.

The material of all three classes being remarkably homogeneous, uniform in structure and free from mechanical defects, no plausible cause could be assigned for the occurrence of this phenomenon. The form of fracture is evidently subject to a distinct law. Up to  $100^{\circ}$  temperature the fractures form well defined cups, with large, mostly unbroken, edges (Fig. 13 *a*). At  $200^{\circ}$  the cup shape of fracture is still maintained, but wherever the edge of the cup is broken the fractured surface runs diagonal to the axis of the test pieces (Fig. 13 *b*). At  $300^{\circ}$  the cup shape has disappeared, and the fracture presents an irregular surface with sharp points (Fig. 13 *c*, *d*, *e*). In Class III these fractures appear also at  $400^{\circ}$ . In Classes I and II the cup form reappears at  $400^{\circ}$  and remains the same with all three classes up to  $600^{\circ}$ , at which temperature the metal is drawn out nearly to a point.

Attention is called to some points which seem of particular interest to the designer. Examining the diagrams in Fig. 10, it will be observed that the lines E. L. (elastic limit) for Classes I and II run nearly parallel, while Class III shows a higher value. In all three classes the strength rises toward  $+20^{\circ}$ , decreases at  $100^{\circ}$  and

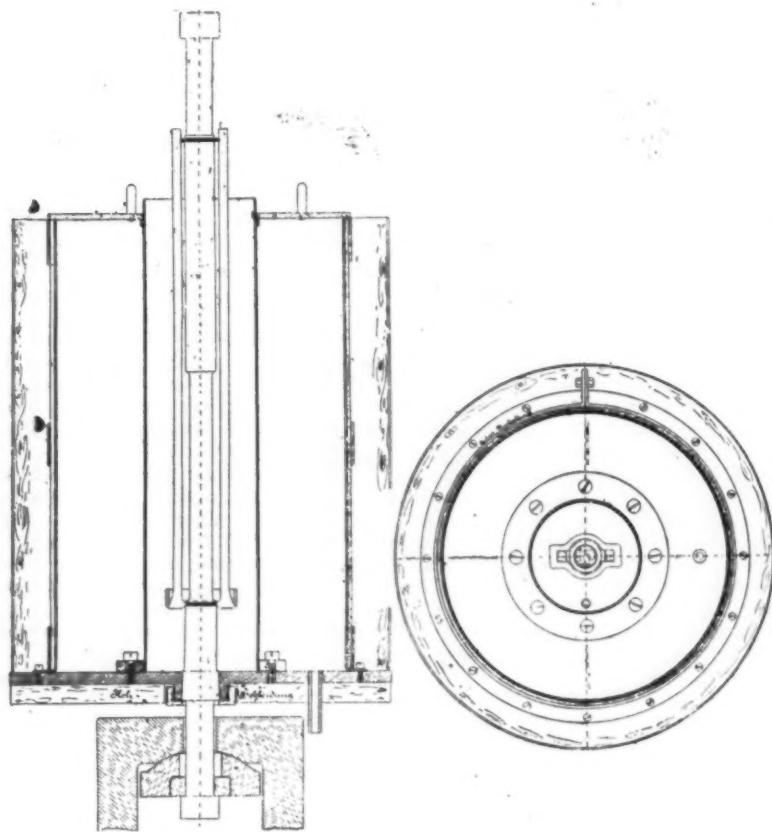


Fig. 3.—Apparatus for Cooling Test Pieces.

to the base line (and is the so-called Limit of Stretch, "Strechgreuze," as distinct from the elastic limit or "Proportionallität Greuze"), at lower temperatures, ceases entirely at  $400^{\circ}$ . From there on the limit of stretch is no longer visible. The point B on the diagrams, indicating the point of maximum load or strength, recedes with increasing temperature, and though there is a good deal of resistance left after B is passed, yet the limit of the available working strength of the metal for safe application in structures is reached at a temperature of  $300^{\circ}$  C. At that temperature the working strength between B and s is still a reliable factor. The zigzag lines *a b* in these diagrams may be due to irregularity in the flow of the metal and partly (and more probably) to the somewhat irregular movements of the pencil tracing the lines, which irregularity was caused by the at times irregular working of the pump attached to the city water works and connected with the apparatus. The accuracy of the measurements taken varied between  $\frac{1}{1000}$  and  $\frac{2}{1000}$  mm. (mm. =  $\frac{1}{32}$  inch). A remarkable feature of these tests are the influences on contraction of the metal at the point of rupture at varying temperatures.

In the diagram Fig. 11 the lines for contraction show its lowest value at  $300^{\circ}$ . Class II of the metal is somewhat lower than Class I. This, however, is a mere accident. Class III again shows a difference in properties, contraction being less than in the other two classes, thus confirming the conclusion that metal higher in strength when cold is also less affected by the temperatures here given. In accordance with this is also the appearance of the fractures. It is very interesting to note the uniformity of the surface of fracture at different temperatures. At  $-20^{\circ}$  test pieces broke near the lower fillet.

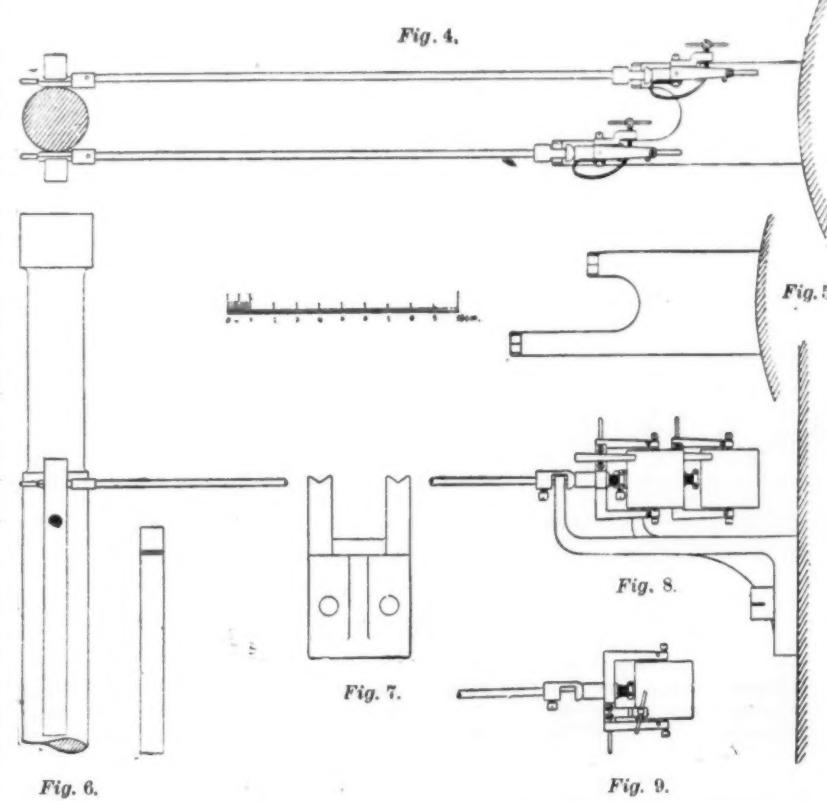


Fig. 4.—Plan of Measuring Apparatus. Fig. 5.—Plan of Support. Fig. 6.—Method of Attachment to Test Bar. Fig. 7.—Front View of Support. Fig. 8.—Elevation of Mirror Measuring Apparatus. Fig. 9.—Rear View of Mirror.

$400^{\circ}$  to  $600^{\circ}$  all test pieces broke near the upper end.

The difference of the point of fracture in the test pieces is probably due to a

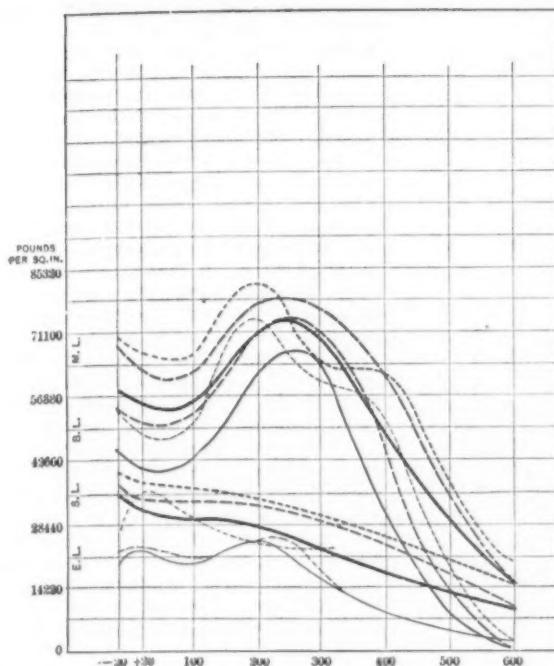
reaches its maximum at  $200^{\circ}$ , from whence it falls rapidly toward  $400^{\circ}$ . The prolongation of the line for Class I is of no value, since there is no elastic limit after

400° is passed. The elongation at the elastic limit is proportional to the load and in conformity to the phenomenon of strength displayed. The designer can, therefore, depend on a uniform ratio of strength to elongation in metal of this

Another phenomenon brought out by the tests needs further explanation. It will be seen that between -20° and +20° the strength increases, while the elongation and contraction decrease. Whether this result is due to defects in the method

The foregoing illustrates the importance of systematic and extensive experiments on the same line.

The thanks of the community are due to the Verein für Gewerbeleis and the Verein Deutscher Eisenhüttenleute for



Figs. 10 and 11.—Class I.—Full Lines. Class II.—Long Dots. III.—Short Dots. E. L.—Elastic Limit. S. L.—Limit of Stretch. B. L.—Breaking Load. M. L.—Maximum Load.

class up to 200° C. No definite conclusion, however, should be drawn from these results on the behavior of structures which are subjected to a temperature above 200° or to frequent changes in temperatures varying between 150° and 300° C. The

of testing, as carried out, or whether it is an indication that at a low temperature metals lose in strength, as has often been asserted and as many times contradicted—this to decide must be left to further experiments.

the generosity with which these two societies provided the means to make these investigations. In conclusion Martens take the liberty to call the attention of interested parties to the direction in which a continuation of these experiments could

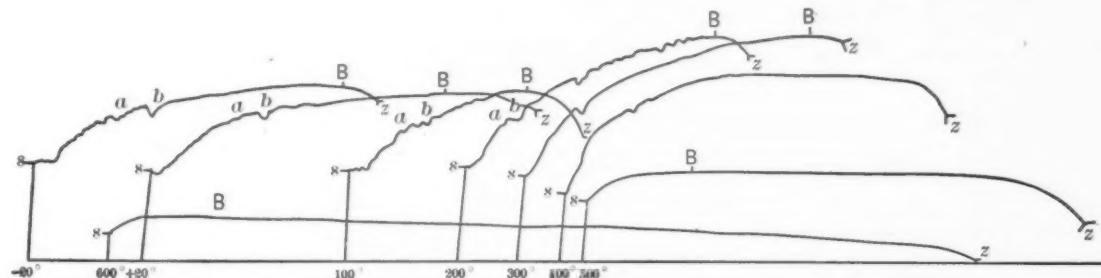
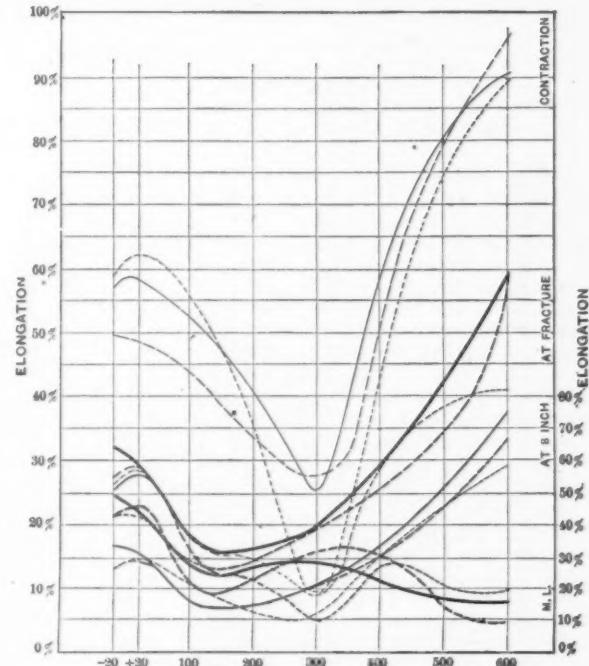


Fig. 12.—Tension Diagrams.

question of safety of a structure is also influenced by another noteworthy factor. Between 200° and 300° we find the metal in that peculiar condition which is generally known as "blue heat." In that condition the metal shows an increased strength, decreased elongation and less

It cannot be denied that the results obtained allow conclusions to be drawn and the deduction of a general law, influencing the behavior of steel of the given grades at varying and higher temperatures. These results confirm the results obtained by other investigators and enrich our

most profitably be followed. As already mentioned, the number of degrees of hardness should be increased and should include the softest as well as the hardest grades of steel. Again, metals which are subject to stain at "blue heat" should receive careful attention. Valuable results would no doubt be obtained by experimenting simultaneously on acid and basic open hearth, basic Bessemer and acid Bessemer steel.

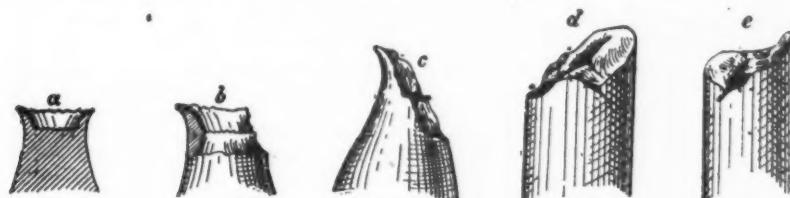


Fig. 13.—Character of Fractures.

contraction. It is less ductile, fracture often takes place without contraction; the metal is in a measure brittle and the surface of the fracture is different than under ordinary conditions. In view of this, the question is an important one to what degree the metal can resist shocks and blows at 300° C.

knowledge on the subject. It must be admitted, however, that valuable as these experiments are, they do not go far enough. Three grades of steel are hardly enough to make conclusive experiments with. At least five grades of steel of various hardness and well defined chemical composition out to be available for the purpose.

The nautical schoolship St. Mary's, since it has been in charge of the New York Board of Education, is an acknowledged failure, there being few graduates, educated at a cost of about \$350 per annum. It is proposed that the Chamber of Commerce shall nominate the directors, but that their appointment shall rest with Superintendent of Public Instruction Draper. Hitherto the St. Mary's has in some years been a sort of floating reformatory, and most of the boys were from New York City. The scheme now is to make it a State school, to make the appropriation a matter of State expense, and to take in boys from every county.

## A Cost System for Small Shops.

### Covering Labor, Material and Management.

BY ARTHUR J. FRITH, C.E.

A brief experience with the management of a machine shop will show that some system of keeping the cost of labor and material, of following the various items of ordering and stock enumeration, of furnishing information to the operative and of detecting the exact causes of waste and delay is necessary to insure that smoothness of running and economy of operation that furnishes the yearly profit.

A large establishment, whose product is mostly duplication, can afford to have special clerks collecting data of every detail, even if this entails considerable red tape, attention and expense, but the more modest manufacturer cannot. To him the information may be curious and interesting, but the corps of experts that many well known methods demand entail a cost he cannot prudently assume. To him we would point out this system, which with a moderate amount of clerical labor has collected valuable information and furnished necessary data with only that amount of detail especially desired.

To obtain this there are used a pattern list, a time book and two printed forms. The form of pattern book is not material, if the exact pattern needed can be easily designated. We preferred one in which all patterns belonging to each machine were distinguished by a characteristic letter and serial number, as explained in detail in an article published in *The Iron Age* some time since.

The time book may have columns for each name, two for each order, used for hours expended on each subdivision of the machine, and those for total time and amount (*Transactions of the Society of Mechanical Engineers*, Nashville meeting, 1888). In this case the time is taken directly from the hands, there is no copying and space for a week's time, is left after each name. This is accurate and rapid and sufficiently flexible for most establishments. By simple addition it gives the total time on each machine, which may be checked and posted into the ledger without regard to the forms that follow. Time cards may, however, be used if preferred. Herewith are given the two forms, No. 1 18 x 5 inches, which is printed in solid type on thin paper, that it may blue print readily, and form No. 2, printed on good paper, legal cap size, to fit a "filing pad."

In the drafting room every machine is represented by but a few general drawings, each embracing a distinguishing set of details, the division being made with especial view to possible future contract work. These drawings have their distinguishing number, and their detail drawings as many as needed the same number. For each of these general drawings a Form No. 1 is filled out with the number, &c., a full list of castings by letter and number, and of shafts, &c., by dimensions, with gauges, special tools, &c., as far as known. Below a reduced copy of the entire drawing is made in bold outline, with pattern numbers and descriptive measurements only, and another full list of materials. This is fastened to the drawing, and when blue printed with it. The order number, date when it is to be finished, and the number of pieces needed for that order are added. The small drawing and second list of materials are cut out of the blue print and a piece of white paper pasted in, upon which the foreman is to note all changes, errors and points of experience, which thus become part of the record and preserved without any exercise of memory, and may be added to the original form for future use. He is also

able to check off all the parts as he receives and finishes them, thus avoiding delays.

The small drawing and the second list cut from the print go to the office, where in many smaller works the proprietor generally looks after the ordering and watches the progress of the work personally. The blue print is here divided

*A Cost System for Small Shops.—Form 1.*

General Drawing No. ....	
For.....	Order No. ....
Has.....	detail sheets.
To be finished.....	Print black.
No. for one machine.	
Miscellaneous, Bolts, Shafts, Castings	
	These three columns to be printed black, that they may blue print white.
	Foreman must note all changes, difficulties, suggestions and further instructions below.

4 x 3 inches space for reduced copy of drawing.					
General drawing No. ....					For....
No.	Castings.	No.	Shafts, Bolts.	No.	Miscellaneous.

and pasted on Form 2, which is filled out and placed on a file with only those orders that are unfinished in the shop. From this the material is ordered, track of patterns and the receipt of castings kept, checked by the proprietor himself; the estimated or previous average cost of labor and material is added. In most cases the latter is sufficient for the order also, but he has by direct comparison a check on

the present cost of manufacture. The time of the men, whether taken directly in a time book or on a time card, is divided by the number of the general drawing they may be using, which is intelligible to them, and calls for no knowledge of mechanical names. If he be a lathe hand his time is posted in Form 2 by the book-keeper under the lathe column; if a vise hand in its appropriate place. This may be done daily, but in many cases once a week was found sufficiently frequent, since a hand is generally a number of days on one number, say a lathe apron, where the sum total of a number of days is readily determined with the least amount of labor. Thus as the job progresses the proprietor is enabled to keep track of the patterns and material, follow the cost from day to day, check it with precise figures, all from one sheet which is thus frequently before him. He can note the cause of delay and spot the special item of expense, and with the small copy of the drawing before him, he has a handy means of identification.

When the machine is finished sheets of Form 2 are fastened together and filed away, forming a complete record of the work, drawing, time of construction and details of cost, in a form adapted to contracting it in parts or in detail, as may be desired in the future.

It will be noticed that by this method no drawings are made without a list of materials, so that no important part can be forgotten. The list is made by the draftsman, who is most familiar with it; it is checked by both foreman and proprietor, who head off mistakes, and from the drawing may supply omissions. There is no copying, and with the time of delivery noted material should be on hand promptly. There is no effort made to keep track of the minute details, though by making a particular set of details under a new number it may be expanded to any degree desired, and the only posting is that of the time, which is done by a few classes of tools instead of individual pieces.

The enumeration of the articles needed must be made by some one, is frequently done piecemeal and several times over, at an expenditure of unnecessary time and patience, and a fact not always appreciated is that a long list of heterogeneous material, unaccompanied by a drawing, is frequently puzzling to all but the man who has made it, hence the method we have followed will recommend itself to many.

### Coke Making in Early Days.

From the pamphlet entitled "Connellsville Coke," recently issued, we take the following account of the manufacture when the industry was in its infancy: It is claimed that coke was used in this country in the manufacture of pig iron a few years before the Revolution. While this is possible, it is not probable that coke was used here at so early a date.

It was not until 1735 that coke was successfully used in England, and it did not come into anything like general use in that country as a blast furnace fuel until 1750. After the Revolution numbers of skilled iron workers found their way to this country, notwithstanding the stringent laws against emigration and the heavy penalties imposed upon those attempting to emigrate, and among these workers were doubtless a few skilled in the manufacture and use of coke. The Pittsburgh *Mercury*, May 27, 1813, contained the following advertisement:

**TO PROPRIETORS OF BLAST FURNACES.**  
—Jno. Beal, lately from England, being informed that all blast furnaces are in the habit of melting iron ore with charcoal and knowing the great advantage it is to proprietors induced to offer his services to instruct them in the method of converting stone coal into coke. The advantage of using coke will be so great that it cannot fail becoming general if put in

practice. He flatters himself that he has had all the experience that is necessary in the above branch to give satisfaction to those who feel inclined to alter their mode of melting ore.

JNO. BEAL, Iron Founder.

In 1816 and 1817 Col. Isaac Meason built the first rolling mill erected west of the Allegheny Mountains to puddle iron, at Plumstock, Fayette County, Pa. This mill went into operation September, 1817, and coke was used in the refinery. This

England to study various subjects relating thereto, and specially charged him to investigate the method employed in the manufacture of iron. In 1835 the Franklin Institute of Pennsylvania offered a premium of a gold medal "To the person who shall manufacture in the United States the greatest quantity of iron from the ore during the year, using no other fuel than bituminous coal or coke; the

coke in Pennsylvania furnaces without success. On June 16, 1836, the Legislature of Pennsylvania passed an act to encourage the manufacture of iron with "coke and mineral coal" which gave the Governor authority to charter companies with ample power to prosecute this branch of industry. In 1849 there was not a coke furnace in blast in Pennsylvania. In 1856 there were 21 furnaces in Pennsylvania and three in Maryland using coke, but none of them using Connellsburg coke, and it was not until the development of the Connellsburg region that the use of coke as a blast furnace fuel came into favor or the manufacture of coke itself in this country assumed any importance.

As early as 1817, as has been stated, coke was used at Plumstock. It is also said that some attempts were made in 1819 to use coke in blast furnaces in the neighborhood. All this early coke was made on the ground; the first coke made in ovens was about 1841. It was in this year, 1841, that Provance McCormick and James Campbell, two carpenters, overheard an Englishman, as the story goes, commenting on the rich deposits of coal in Connellsburg and its fitness for making coke, as well as the value of coke for foundry purposes, and they determined to enter into the business of manufacturing coke. Associating with them John Taylor, a stonemason and the owner of a farm on the Youghiogheny River, including a coal mine which he operated in a small way, they commenced operations. Taylor constructed two ovens, and in the spring of 1842 enough coke had been made to fill two boats 90 feet long, or about 800 bushels. They started down the river on a high stage of water to Cincinnati. On reaching that city they found that the demand for coke was not as brisk as they had hoped to find it. The new fuel was unknown there, and foundrymen regarded it with suspicion, calling it "cinders." Campbell, who went with the boats, remained at the landing three weeks, retailing out one boat load in small lots at 8 cents a bushel. He traded the balance to Miles Greenwood, a foundryman at Cincinnati, for a patent iron grist mill. The mill was brought to Connellsburg and when put in operation was found to be a failure, and it was sold for \$30, and so ended the first coke manufacturing firm in the Connellsburg coke region.

A part of their cargo, which had been traded for the patent mill, was afterward boated by canal to Dayton, Ohio, and there sold to Judge Gebhart, a former resident of Fayette County, who then had a foundry in operation in Dayton. He used the coke in his establishment, and found it so well adapted for his purpose that he soon after came to Connellsburg and proposed to Campbell and McCormick to make more, but the result of their previous venture in the coke trade satisfied them. In 1843 the ovens built by Taylor were rented to Mordecai, James and Samuel Cochran, who used them in making 24 hour coke. When they had coked about 1300 bushels it was boated to Cincinnati and sold to Miles Greenwood, who, in the meantime, had become acquainted with the value of coke as a fuel. This is said to have been the first coke ever taken from Fayette County and sold for money, and was the beginning of the coke business in the Connellsburg region, and the Cochran must be considered the pioneers in the coke business in that region. James Cochran, one of the three named above, or as he is familiarly known, "Little Jim," is still in the business. He has his sons associated with him, and is operating under the firm name of James Cochran, Sons & Co.

About 1850 three or four ovens were built and put in operation by Stewart Strickler, the product being sold by him to the Cochran, who boasted it to Cincin-

*A Cost System for Small Shops.—Form 2.*

Holes	<input type="radio"/>	for	<input type="radio"/>	Filing.	Order No.....
For.....	From.....	General drawing No..... Title.....			
Estimated or previous average cost of labor.					
Space 3 x 4 inches for pasting blue print of reduced drawing.					
Date of delivery.....	Actual delivery.	Date.....	Date.	Pattern makers.	
Weight.	Cost.	No. for this order.	Check.	Lathes and boring hands.	
Cost.	Cost.	When ordered.	When delivered.	Planing, shaping and grinding.	
Check pattern when made.				Gear cutting, slotting and special tools.	
Material needed.				Blacksmith, sheet iron and riveters.	
Totals.				Foreman and laborers.	Vise hands, fitters.
Grand totals.					
Remarks.					
Waiting for					

is the first definite statement that can be found concerning the use of coke in this country. It is interesting to note that the coke used at this mill was made on Redstone Creek, in Fayette County, which to-day is the greatest coke producing county in the United States. The next notice we have of the use of coke was at a blast furnace on Bear Creek, Armstrong County, Pa. This furnace was built to use coke, and went into operation in 1819. It was, however, unsuccessful, the blast being weak, and the furnace chilled after making two or three tons of iron.

In 1835 the Acting Committee of the Pennsylvania Society for the Promotion of Internal Improvement sent an agent to

quantity to be not less than 20 tons." In the same year this offer was made William Firmstone was successful in making good gray forge iron for about one month at Mary Ann Furnace, in Huntingdon County, with coke. Firmstone is doubtless entitled to the honor of having been the first successful manufacturer of coke pig iron in this country, just about 100 years after the successful use of coke in England.

In 1837 F. H. Oliphant made coke iron at his Fairchance Furnace, near Uniontown, and in a letter to the Franklin Institute, dated October 3, 1837, he claimed the premium offered by them. From 1836 to 1839 other attempts were made to use

nati and sold it. For some years but little coke was made, though a few ovens were built and that knowledge acquired which was necessary for the coming development of the trade. The trade increased somewhat in 1851, and in 1855, it is stated, there were but 26 coke ovens above Pittsburgh. It was not until the Pittsburgh and Connellsburg Railroad was completed to Connellsburg, and Connellsburg coke had been successfully used in the Clinton Furnace, Pittsburgh, that its value as a furnace fuel was fully demonstrated and the foundation laid for the demand that has resulted in such an unprecedented development of coke manufacture in the Connellsburg region.

## THE WEEK.

A dispatch has been transmitted from the State to the Treasury Department from Minister Denby, at Pekin, stating that orders have been issued in China making the Canton dollars and parts of dollars legal tender with full Imperial sanction. All merchants and others are ordered to receive the coins at their standard value. "There can scarcely be any doubt," Mr. Denby says, "that the introduction of this coinage, should it be generally received and not tampered with, will work a financial revolution in China."

Three of the seven factories belonging to the Illinois Glass Works, at Alton, were destroyed by fire. Loss \$100,000.

The delivery of the German mails will be expedited by assorting them aboard the steamers in mid-ocean. The British mails from America are assorted between London and Queenstown.

A prominent citizen of the new State of Washington says: "Spokane Falls is the eastern metropolis of the State, with a growing population of 25,000 inhabitants. Some idea of the place can be gathered from the fact that the city has everything that you can imagine in the way of improved electric light, cable railroads, water works, fire department and fine buildings, and the country round about is big enough to make us constantly bigger. Why, one county just below produced 12,000,000 bushels of wheat last year."

The Spanish Minister of Marine declares in favor of rapid steaming cruisers instead of costly ironclads, the first and second class to have minimum speed of 20 knots under natural draft.

Eight thousand Chinamen will be imported to work on the Tehuantepic Railroad.

Wall street troubles as yet have no effect on industrial enterprise in the South.

Thirty-one acres in the business section of Lynn, Mass., were burned over a year ago, destroying property valued at nearly \$5,000,000. To-day the entire area is covered with handsome substantial structures.

The great wooden ship Shenandoah, launched by Sewall & Co., Bath, Me., last week, said to be the largest in the world, has a steel bowsprit 65 feet long, rigging of wire, and instead of common rope ratlines has sections of gaspipe, and her lights are carried in iron towers fastened on the forecastle just abaft the catheads. She measures 325 feet in length over all, 49 feet in breadth and 28.8 feet in depth, with a registered gross tonnage of 3406.78, and net 3258.47 tons.

In the partition of Africa by the European powers, which has been going on much after the fashion in which Pope Julius parceled out all the world except Europe to Spain and Portugal, France has secured 2,300,000 square miles, against

1,909,000 owned by Great Britain, 1,030,000 by Germany and 775,000 by Portugal. Much of France's possessions are, it is true, in the western part of the Sahara; but exploration has shown that that region is not the barren territory which it was so long supposed to be.

The probable ultimate effects of experimenting with unlimited silver coinage are tersely stated by a contemporary, who says: "Free coinage means the issue of paper dollars for silver bullion at the rate of about \$1.29 per ounce. The price of the bullion in terms of paper currency would then be maintained, no doubt, but what would maintain the value of the paper currency? If the bullion market abroad should fail to follow that of New York, and people in other countries should refuse to pay more than \$1 or \$1.05 in gold for an ounce of silver, the inevitable consequence would be a depreciation of the paper dollar. It would become worth 77 cents or more, and gold would be quoted at a premium. The effects upon all the industries and business of the country would be so startling that men may well take all possible care before committing themselves or their party to such a step."

The Dominion Government has granted a subsidy for the maintenance of a fast Atlantic line, comprising four twin screw steamers, between Liverpool and Halifax, and a line between Vancouver and the Australia colonies is contemplated as a part of the arrangement. The contract is made with the Naval Armament and Construction Company of London. It is estimated by Bryce Douglas and others who are pushing the new company that they will be able to reach Chicago at least 24 hours earlier than is now possible by New York or any other route.

Cincinnati now claims to surpass all other cities in the manufacture of wood-working machinery.

The report of the Secretary of the Interior says that the vacant public lands comprise 586,216,861 acres, exclusive of those in Alaska. It favors acquisition of a large portion of the Indian reservations.

By a decision of the Washington County, Md., Circuit Court the Baltimore and Ohio Railroad Company get possession of the Chesapeake and Ohio Canal, thus obtaining a monopoly of the coal trade.

Statistics of railway building in ten Western States and Territories, just published by the *Engineering News*, show that there have been 1404 miles of track laid since January 1, 1890, and there are now 2617 miles under construction, 3920 miles under survey and 4977 miles projected for future construction. The greater part of the active work is confined to the States of Washington, Montana and Colorado, and is being carried on by the Northern Pacific, Great Northern and Union Pacific companies. Over 44 per cent. of this year's tracklaying and 40 per cent. of the mileage under construction is the work of these companies.

Stanley, the explorer, speaks of the chances for American enterprise in Africa. He says: "Suppose a Yankee schooner comes over to the Congo River laden with canned goods, lumber, chairs, American notions of that kind, a few hams, wheat, flour, corn meal, &c. Then the cargo must include all kinds of fabrics from the most precious velvet or silk to the most common cotton. Well, you get a cargo of those things to the Congo and they will sell like lightning for 100 per cent. profit. In exchange you can get either money or palm oil, and in bringing the last back to civilization you can realize an immense profit. I am convinced that fortunes can be made in this way just as before the war by

American cargoes. If you think of going out with such a cargo, and don't know exactly what to include in it, just sit down and think what you yourself would like to have in such a land, far from civilization. The ship can go right to the river. It is not necessary for it to go inland. To Kabinda is about 20 miles, then go to Gaboon, then right along to the Spanish factories, and then to Old Kalabar."

The profits of British shipbuilders are shown in two instances by financial statements made public. Armstrong, Mitchell & Co., of Newcastle-on-Tyne, have no less a sum than \$1,171,265 net profits for the last 12 months. The Palmer Shipbuilding Company of Yarrow have \$341,000 available for distribution as dividends, so that the shipbuilders named made, clear of all expenses, over \$1,500,000 during a year of not by any means unmixed prosperity.

Plans of a bridge across the Missouri River between Omaha and Council Bluffs have been accepted by the Burlington road and others interested, to cost \$1,500,000.

An application by the retail coal dealers of Philadelphia for a charter as a trust or corporation "to protect dealers from unwarranted increase in sales or prices" was refused by Judge Gordon of the Common Pleas. He flatly declared that the object of the proposed trust is to enable a number of retail coal dealers to combine together with corporate powers to benefit and enrich themselves, irrespective of the public welfare, and on this ground based his action.

The New York tanners will soon start a night school to give instruction in cutting, drafting, &c., in tin and sheet iron work. The various foremen in the union will take turns in giving instruction.

The new ocean greyhound, Fuerst Bismarck, for the Hamburg line, was successfully launched at Stettin last Saturday, by the Vulcan Shipbuilding Company. She is the largest steamer ever constructed in Germany. She has a length of 510 feet, a width of 57½ feet, and a depth of 38 feet from the upper deck to the keel plate. Her twin engines will develop 8000 horse-power each, and her guaranteed speed is 20 knots.

The managers of the Canadian Pacific Railway are said to be planning a direct entrance into New York City either by a connection at Buffalo or crossing the State border at a point on the St. Lawrence River between Montreal and Toronto, and from thence by some route parallel to the Hudson River.

The spring wheat and oat crop of Ontario is below the average of the last nine years, but the yield of fall wheat is better.

Immigration into the United States during the month of October amounted to 46,267 persons, against 39,034 for the same month last year, and for ten months the arrivals have been 427,666, against 378,140 for the same months of 1889. A larger proportion than usual appears to be of the least desirable classes.

The United Building Trades Council of Chicago propose to organize in order to control wages.

Representatives of the various trades in Philadelphia are discussing a plan for the establishment of a large central exchange where all can meet daily and display samples of their products.

President Howell of the East River Bridge says no time should be lost in building three more similar structures, to supply the increasing demand.

Cotton shipments in the South are much delayed by difficulty in obtaining money to defray expenses.

## MANUFACTURING.

### IRON AND STEEL.

Thomas Furnace, of the Thomas Furnace Company, at Niles, Ohio, has been almost entirely rebuilt, at a cost of \$90,000, and was put in blast last week. The furnace is operated on Bessemer iron and is expected to turn out about 200 tons per day.

The Illinois Steel Company put a new merchant bar mill in operation last week in their Bay View Works, at Milwaukee.

The Great Western Iron and Steel Mfg. Company, recently organized at Seattle, Wash., have placed a contract for two Ford & Moncur patent fire brick hot blast stoves for their blast furnace plant on Puget Sound. The first cargo of brick was recently shipped from the works of the Seaton Fire Brick and Sanitary Tube Company of Workington, England.

The Hubbard Iron Company, at Hubbard, Ohio, manufacturers of bar iron, have just completed the erection of a building 60 x 100 feet, in which they have built one double puddling furnace, and another is in course of construction. To these furnaces are connected Hazelton boilers of 75 horse-power each. In a few days the firm will commence the erection of two more boilers of the same design and capacity.

In a recent issue we made mention of the formation of a new steel casting concern at Sharon, Pa., of which F. T. Aschman, of that place, was to be general manager. The new company have bought the works of the Evans Iron Company, in Sharon, and are remodeling it to serve as a steel foundry. Various alterations, additions and improvements are being made. The open hearth furnaces and annealing ovens are to be built by the S. R. Smythe & Laughlin Company of Pittsburgh. The pits for the foundations of the furnace and gas producers are now ready and work on the latter will soon be commenced. The plant will be ready for operations early in January next, and will turn out steel castings of all kinds for railroads, steamships, rolling mills, &c. About 40 hands will be employed at the start. The style of the new concern will be the F. T. Aschman Steel Casting Company.

Carnegie, Phipps & Co., Limited, of Pittsburgh, will probably break ground during the present week for the erection of a new 36-inch beam mill. It will be erected adjacent to their present plant at Homestead, Pa.

Mount Vernon Furnace of the Campbell Iron Company, at Campbell, Ohio, was blown out recently for the purpose of making repairs. Operations will be resumed as soon as possible.

Mabel Furnace No. 1 of Perkins & Co., Limited, at Pittsburgh, is idle at present undergoing needed repairs.

The auditors appointed to adjust the claim of the sheriff of Allegheny County, Pa., against the Allegheny Bessemer Steel Company of Pittsburgh for the wages of deputies who were employed during the strike at the works of the firm have awarded the sheriff \$4693.

Advices from Nelsonville, Ohio, under date of the 28th ult., state that an important consolidation of the iron and coal interests of the Hocking Valley is under way. The companies united up to date are the Superior Coal and Iron Company of Athens, the Shawnee and Iron Point Coal and Iron Company and the Ohio and Western Coal and Iron Company, under the name of the Hocking Valley Coal and Iron Company. A mortgage of \$4,000,000, through the Mercantile Trust Company of New York, has been filed in the counties of Vinton, Athens and Perry, Ohio. The company were incorporated under the laws of West Virginia, with a capital stock of \$1,500,000. John C. Staunton of New York is president of the company and David J. McNiece secretary and treasurer. The point of importance is that the Baltimore and Ohio Railroad, through several of its officers as individual holders, has secured a large interest.

A law suit somewhat out of the ordinary was entered in the courts at Pittsburgh last week. A bill in equity was filed by the Pittsburgh Steel Casting Company against the Hainsworth Steel Company. It was stated that the two steel companies are located on opposite sides of Railroad street, between Twenty-sixth and Twenty-seventh streets. The defendants, it is asserted, have two steel converters, which at every heat throw out sparks which strike against the plaintiffs' building. They are afraid of a fire, and asked the defendants to make some arrangement to prevent the sparks flying, but they have neglected to make any. An injunction is asked for to restrain the defendants from the use of the converters until the sparks are arrested.

A number of extensive improvements are now being made at the Warren mill of the Youngstown Iron and Steel Company, at Warren, Ohio. There have recently been

built three single and two double puddling furnaces, with Hazelton boilers attached. Two additional double puddling furnaces with Hazelton boilers are also in course of erection. A testing machine built by Riehlé Bros. of Philadelphia and a cold straightening machine are also being added to the equipment of the plant. Considerable new railroad track has been laid and a number of small cars have been built for the purpose of conveniently handling piles to heating furnaces and the finished iron from the rolls. The finishing department of the plant is doing very satisfactory work, turning out over 100 tons per day with a 10-inch and 20-inch train.

Joshua S. Ingalls & Co., Troy, Ohio, report that they have orders for Craig steel for 1891 delivery.

A mistake was made in our last issue in giving the location of the Princess Iron Company as Iron Gate, Va. The plant is located at Glen Wilton, Va., and the company have no connection whatever with the Iron Gate operations.

The Boston and Louise Development Company have been organized at Mineral City, Va., to erect a 100-ton iron furnace.

The Richmond Standard Spike Works Company, recently organized at Richmond, Va., it is stated, bought the Iron Gate Rolling Mill, at Iron Gate, Va., and will enlarge same. The company will erect car works and spike mill adjacent.

The Fawnville Coal and Iron Company have been organized at Fawnville, Va., with a capital stock of \$1,000,000.

An iron pipe works plant will be established at Ivanhoe, Va., by a Philadelphia company, now reported organizing.

A steel plant is to be established at New Castle, Va. The Junction City Land and Improvement Company are at the head of the enterprise.

J. F. Johnson, in company with Eastern capitalists, is thinking of establishing a 75-ton rolling mill at Birmingham, Ala.

The stockholders of the Bethlehem Iron Company of Bethlehem, Pa., have voted to increase the capital stock from \$3,000,000 to \$5,000,000. The total stock vote on which the increase was authorized was 50,662 shares, or more than four-fifths of the full stock. The increased stock will be put out by the Board of Directors as the money is needed and as the interest of the company demands.

Eastern parties are reported to have recently purchased \$10,000 worth of real estate around the town of Mascot, Tenn., and will establish a steel plant.

A movement is on foot at Bridgeport, Ala., to establish a rolling mill in that place.

No. 1 furnace of the Phoenix Iron Works, Phoenixville, Pa., blew out on the 23d ult.

Both of the furnaces of the Hudson Iron Company, Hudson, N. Y., went into blast on the 20th ult. These furnaces had been idle since early in the year.

Aurora Furnace, of Schall, Steacy & Denney Company, Wrightsville, Pa., will have been in continuous blast for four years on January 3 next. The furnace is still in good condition, averaging over 52 tons per day, and apparently capable of much good work yet.

No. 2 of the Maryland Furnaces, Baltimore, goes into blast this week.

The Etna Iron Works and 17,000 acres of land were offered for sale at Cincinnati, Ohio, on November 25. The lowest bid that could be received was \$400,000, and as but one-half this amount was offered, no sale was effected.

The Landon Charcoal Furnace, of the Landon Iron Company, Chapinville, Conn., one of the oldest stacks in the Salisbury district, went into blast Monday last, after an idleness of some years. During the past five months extensive repairs and improvements have been carried through, and under the management of J. J. Morehouse the company expect to turn out a superior quality of Salisbury car wheel iron.

The Philadelphia Furnace, at Florence, Ala., is nearing completion, and will go in blast about the first of the new year. It is now being stocked up with a three months' supply of ore from the Sharpe & McClanahan mines of Pinkney, Tenn.

The Bessemer department of the Otis Iron and Steel Company, Cleveland, Ohio, which has been idle for the past three weeks on account of a strike, has started up with new labor.

The iron and nail works of the South Tredegar Iron Company, at Chattanooga, Tenn., have been purchased by the Cardiff Land Company, and are to be removed to Cardiff and enlarged.

At the works of the Wrought Iron Casting Company, at Neponset, Mass., a bed plate for a hammer head manufactured for the Lock-

wook Mfg. Company of East Boston, Mass., has just been cast. The plate weighs 2500 pounds, and 3000 pounds of metal was poured in securing it. It took six crucible furnaces and one open-hearth to melt the metal for the cast, which is the largest wrought iron cast on record. A perfect cast was secured.

Roanoke furnace, at Roanoke, Va., blew in on the 1st inst.

The old iron rolling mill at Roxbury, Conn., is to be torn down and a large grist mill built on the site.

The report that the Wellman Iron and Steel Company, at Chester, Pa., had closed down their new Bessemer department indefinitely is authoritatively denied. The stoppage was only temporary, for repairs, and the works were to start again on the 2d inst.

The old men of the Bessemer department of the Otis Iron and Steel Company of Cleveland have rejected a proposition to return to work on the basis of \$2 per 100 tons for tonnage hands.

The Waugh Steel Works, at Belleville, Ill., were compelled to shut down on the 26th ult. owing to lack of coal on account of the strike of the miners in that section.

### MACHINERY.

William Tod & Co., of Youngstown, Ohio, have received an order from the Pennsylvania Steel Company of Steelton, Pa., for their No. 1 table to be placed in their new rail mill at Sparrows Point, Md.

The Kanawha City Company, Charleston, W. Va., want machinery for the manufacture of brick. Daily capacity 20,000. For particulars write to B. D. Avis, general manager, or T. O. M. Davis, secretary, Charleston, W. Va.

The Totten & Hogg Iron and Steel Foundry Company are receiving a great many orders from all parts of the country for their Foster rock and ore breakers, and have just shipped one to Japan and a carload to the Pacific Coast, and have received an order from Nova Scotia for one, with good prospects for more to follow, and are now negotiating with parties in Riga, Russia, Berlin, Prussia, Sydney, New South Wales and several parties in South America.

The National Pipe Bending Company, at Fairhaven, Conn., are erecting a large factory on the Quonipiac River, together with a large wharf, to be used exclusively for the iron pipe department.

The Riverside Foundry Works of Cleveland, Ohio, Maher, Brayton & Co., proprietors, destroyed by fire November 16, 1890, is now being rapidly rebuilt to double the capacity of the old plant, and will be completed and ready for business January 1, 1891.

The Carroll-Porter Boiler and Tank Company, of Pittsburgh, are operating their large plant full time and have plenty of work on hand. The works of this firm are equipped with most modern machinery, and they do a large amount of flanging of boiler heads for other concerns that have not the necessary machinery. The office of the firm has recently been removed from 212 Penn avenue to their works on the corner of Penn avenue and Second street, in that city.

The Moore & White Company are now established in their new building, Lehigh avenue and Fifteenth street, Philadelphia. The structure is one story in height and was especially designed for their business. The extreme length is 360 feet, breadth 60 feet, and with an L addition on Lehigh avenue of 60 x 60 feet. The company report an exceptionally large amount of business on hand, both in the friction clutch and paper machinery departments.

Glover Bros., iron founders, at Frankford, Pa., have broken ground for a new plant, which will give employment to about 100 hands. They are to erect at once a brick building 52 x 120 feet, which will be divided into four large rooms with a clearance of 16 feet from floor to beam. There will be a rumbling room, a finishing shop, a machine shop 30 feet square and a two story pattern loft 20 x 50 feet. The latest improved machinery is to be introduced, together with a 35 horse-power boiler and engine. The new plant will adjoin the foundry of Green & Linehan.

The Lloyd-Booth Company, proprietors of the Falcon Foundry and Machine Works, at Youngstown, Ohio, are running their plant to its full capacity, and have a large amount of work on hand. At present they are building for the Reeves Iron Company of Canal Dover, Ohio, one 20-inch three-high muck train and rotary squeezer, also one 22-inch sheet train, including duplicate rolls. For the Shenandoah Furnace Company of Shenandoah, Va., they are erecting one 18-inch three-high bar train, shears and underground hot saw and one 10-inch three-high guide train and shear for same. Last week they shipped to the National Forge

and Iron Company, at East Chicago, Ind., one 18-inch three-high double muck train, squeezer, ore pan, shear, &c. For Cartwright, McCurdy & Co., proprietors of the Enterprise Iron Works, at Youngstown, Ohio, they are building and have about ready for shipment one 20-inch three-high double muck train and squeezer, muck shear, ore pan, &c., and for the Burgess Steel and Iron Works, at Portsmouth, Ohio, one 18-inch three-high bar train. In addition to the above the firm have a number of other orders on hand that will keep them busy for some time to come.

Heyl & Patterson of Pittsburgh are erecting at Utley, Ohio, for the Federal Valley Coal and Coke Company a special tooth coke crushing plant, with a capacity of 200 tons per day. The screen is 6 x 16 feet, and is made in segments, after the latest and most improved pattern. The crusher grades the coke into three sizes.

The Forsythe Scale Company of Youngstown, Ohio, manufacturers of scales of all descriptions, are meeting with a large demand for their goods, and are operating their works to their full capacity. They have now under construction a 100-ton scale for the Youngstown Steel Company of that city.

Thomas J. Bray, superintendent of the plant of the Paige Tube Company, at Warren, Ohio, has been granted a patent on a machine for cold rolling metallic pipe. A half interest in the patent has been assigned to the Paige Tube Company.

The Fuel Gas and Mfg. Company of Pittsburgh have completed the removal of their machinery and offices to the buildings recently occupied by the Westinghouse Air Brake Company in Allegheny, Pa. The working force will be increased largely and the capacity doubled in the new location. The company will extend their line of manufactures so that they will include gas and water meters, water heaters, gas saving appliances for heating and cooking stoves and gas regenerators. A brass and iron foundry will be run on the company's and also on general work. The water meter mentioned above is known in England as the Kent, the patents for which in the United States and other portions of North America the company have secured. The meter is intended for use in cities where the domestic consumption of water is measured. Two great claims made for the meter are its simplicity of construction and its accuracy.

The Southern Machinery Company have been organized at Atlanta, Ga., for the purpose of doing a general business in railway equipment, machinery and supplies. The company have a commodious warehouse and excellent facilities for prompt shipment of their goods.

Silk & Smith of Eighth and Lock streets, Cincinnati, manufacturers of machine tools and heavy machinery, having found that their present location was inadequate to their wants, have arranged for a bonus offered them by the Board of Trade to remove their plant to Kenton, Ohio. A joint stock company has been organized under the laws of Ohio with a capital stock of \$50,000, of which \$10,000 was taken by Springfield and Kenton capitalists. Their building, 60 x 150, with engine room 45 x 45, is about completed and will be ready for occupancy within a week, when the machinery and tools of the Cincinnati plant will be removed to Kenton.

The Donaldson-MacRae Electric Company have been incorporated at Baltimore, Md., by W. W. Donaldson, Roderick MacRae, A. H. Robinson and others, with \$20,000 capital stock. The company will establish a plant for the manufacture of electrical machinery.

The Kingsley Foundry and Mfg. Company of Elyria, Ohio, have secured a location in Hammond, Ind., and will erect on it a plant to cost \$30,000.

The Cleland Machine Works Company have been organized at Lynchburg, Va., with C. P. Poole as president and C. W. Poole, secretary, and will purchase and operate the machine shops and iron foundry of James Cleland & Son. The capacity of the plant is to be considerably enlarged and many improvements added.

Machine shops will be built at Yoakum, Texas, by the San Antonio and Arkansas Pass Railway Company.

It is stated that R. E. Sanford has purchased the iron foundry and machine shops of the Laredo Foundry and Machine Company, at Laredo, Texas, and will add \$7000 worth of improved machinery.

Additional machinery is being added to the machine works of Detrick & Harvey, at Baltimore, Md.

Machine shops are to be erected at Corpus Christi, Texas, by the Corpus Christi and South American Railway Company.

New machine shops and round house are to be erected at Manchester, Va., by the Richmond and Petersburg Railroad Company.

Jacob Schuele and others at Dublin, Texas, are reported organizing a company to manufacture newly patented ice manufacturing machinery.

At Louisville, Ky., the Sulzer-Vogt Machine Company are building a boiler works 168 x 113 feet in dimensions.

A company is being organized at Bristol, Penn., with \$25,000 capital stock, to build and operate machine shops and iron foundry.

We are advised by E. N. Porter & Co., Burlington, Vt., that the sale of their extension window screens, metallic corners, &c., during the past season was quite satisfactory. Their new building, three stories high, 33 x 50 feet, is almost completed and will be occupied by them soon.

The Potter & Atherton Machine Company of Pawtucket, R. I., are doing such a large business that they are obliged to build another shop, ground for which they have already purchased.

The Miller Iron Foundry, at Olneyville, R. I., was partially destroyed by fire Saturday.

The Fitchburg Engine Company, Fitchburg, Mass., will move their entire plant to Gardner, Mass., next year, at as early a date as a building can be erected for them. When finished the building will be 170 x 70 feet.

The Coulter & McKenzie Machine Company, of Bridgeport, Conn., are planning to make a large addition to their works.

W. B. Hale and others have inspected land at Milford, Mass., as a possible site for a Millbury Iron Foundry, the proprietors of which have expressed a desire to locate in Milford. The firm make castings, &c., employing 75 or 80 hands.

#### HARDWARE.

The Colebrookdale Iron Company, Pottstown, Pa., are manufacturing sad irons, tailors' irons, gray and japanned castings, and are at present very busy, employing 115 hands, running day and night, with many orders unfilled. Their principal work is sad irons, while they also carry on a general foundry business.

The Morse Twist Drill Company, New Bedford, Mass., are about finishing an addition to their plant, 160 x 36 feet, two stories high, with an annex 40 x 80 feet of one story.

The John P. Lovell Arms Company, Boston, Mass., owing to their inability during the past year to meet the demands for their Diamond Safety Bicycle, have made extensive preparations for next season by the addition of new machinery at their works, and have so increased their facilities that they feel justified in assuring the trade that they will be in position to fill orders promptly.

The Tucker & Dorsey Mfg. Company, Indianapolis, Ind., by reason of the largely increased demand for their productions, have been compelled to increase their manufacturing facilities by the erection of a new brick warehouse 45 x 85 feet. A new line of manufacture has been added, that of producing the Tucker Patent Caster, for which the makers claim great merit, in that it is one of the simplest, most durable and cheapest casters on the market. The company are now arranging a brick structure 25 x 80 feet for their manufacture, placing therein new machinery, tools, &c.

The Arcade File Works, one of the oldest in the country, are considering the advisability of moving their entire plant from Sing Sing, N. Y., to a location where increased facilities for manufacturing may be had. They find this step necessary owing to the steady growth of their business and lack of space in which to extend their works. The concern employ about 150 hands, and propose enlarging so as to double their production.

The Cushing Wire Nail Factory, at Palmer, Mass., is now located in its new quarters, and more machinery will be added at once. When this business is well under way a large share of the product of the Palmer Wire Mill will be used in making the nails.

On Saturday, the 22d ult., the plant of the Bellaire Stamping Company, manufacturers of stamped ware and sheet metal specialties, was destroyed by fire, the destruction of the buildings containing their machinery being complete. The offices of the company and their new warehouses were saved. The loss amounted to about \$150,000, with an insurance of \$80,000. The firm advise us that they will rebuild, and expect to resume operations in the near future.

The Youngstown Stamping Company of Youngstown, Ohio, are having an excellent demand for their glass oil can, known as the Friend. At present they are running their plant exclusively on the manufacture of this

class of goods, of which they are said to be the largest manufacturers in the United States.

Bornholz & Co., 143-145 Bank street, New York, smelters and metal dealers, have enlarged their works to a considerable extent, and are now prepared to deliver their standard solders on short notice.

The Pecora Paint Company, Philadelphia, Pa., have removed to their new factory, which they have erected during the past year, as the volume of business compelled them to provide larger quarters. They now have increased shipping facilities, with improved devices for conducting the business, which they state will enable them to fill orders with dispatch.

The Milton Mfg. Company, Milton, Pa., manufacturers of wrought iron plate washers, are doing a large business, and have not been able to fill orders promptly. They have, however, within the past month made improvements in their plant, and advise us they now have a capacity of 20,000 pounds of plate washers, or 100 kegs per day.

#### MISCELLANEOUS.

On the 25th ult. a charter was granted to the Amyville Youghiogheny Gas Coal Company of Pittsburgh, capital \$25,000. The directors are S. H. Vandergrift, J. J. Vandergrift and J. Buchanan, all of Pittsburgh.

The Main Belting Company, Philadelphia and Chicago, find their new factory in the first mentioned city none too large for their constantly increasing trade. They are running to their full capacity.

The Kanawha City Alkali Company, capital \$2,500,000, have been organized and charter issued. B. D. Avis of Washington, D. C., president; M. P. Ruffner of Ruffner Bros., wholesale grocers, vice-president; T. O. M. Davis, secretary; Neil Robinson, president of Citizens' National Bank, treasurer; E. L. Boggs, wholesale druggist, and Col. W. A. McCorkle, vice-president Citizens' National Bank, attorney. The company propose to manufacture salt, so'a ash bromide, bicarbonate soda and various kinds of chemicals. They will employ from 1000 to 1500 hands.

The Webster Vacuum exhaust steam economizer, made by Warren Webster & Co. of Philadelphia, New York and Chicago, is a very effective device for heating and purifying the feed water for steam boilers, with the special feature that it is a receptacle for the condensation of the heating apparatus, which is returned to the boiler, thus dispensing with a receiving tank. The advantages claimed for the apparatus are that 40 per cent. more water can be heated and purified with a given quantity of exhaust steam and to a higher temperature than can be attained by any pressure, coil, tubular or open heater, from the fact that there is no waste of exhaust steam through the exhaust pipe until all the water passing through the economizer has reached a temperature of from 200° to 212°. The manufacturers have just issued a large illustrated catalogue fully describing the apparatus and containing letters from those who have used it.

W. H. Chenoweth & Co., 78 West Monroe street, Chicago, are building new architectural iron works at Fillmore and Rockwell streets. Their plant will cover a space 286 x 136 feet, and will be much larger than their old works, enabling them to handle a greatly increased line of trade.

The Dunham Mfg. Company have removed their main office from Boston to Chicago, occupying a suite of offices from 703 to 707 in the Phenix Building. Their removal to Chicago was caused by their rapidly increasing trade in the West. They manufacture a line of specialties, mainly used by railroads, having factories at Bridgeport, Conn., and Troy, N. Y. They contemplate the establishment of a factory at Chicago in the near future. Branch offices are maintained by the company at 103 Milk street, Boston, 120 Broadway, New York, and 61 Imperial Building, Montreal.

The P. E. Lane Bridge Works have purchased a site in Hammond, Ind., to which they will shortly remove their plant, greatly enlarging it.

The Joliet Improvement Company of Joliet, Ill., have donated 20 acres to the Novelty Iron Works of Peoria, Ill., who will soon erect shops on a part of the tract.

Among recently authorized corporations in Illinois are the following: Meter Register Company, to manufacture and sell meters and meter appliances, &c.; capital stock, \$500,000; incorporators, Dorr E. Felt, George W. Martin and C. J. Deboard. Chicago Promotion and Construction Company, to promote manufacturing industries and do a general manufacturing business; capital stock, \$500,000; incorporators, Robert H. Smith, A. J. Fisher and F. A. Woodbury. Scoville Iron Works, to conduct a foundry and machine shop; capital stock, \$75,000; incorporators, Hiram

H. Scoville, Frank B. Macomber and David D. Drummond, Grand River File Company, at Chicago; to manufacture files; capital stock, \$300,000; incorporators, Gideon E. Meigs, E. L. Shepard and Justin J. Westmore. Stiger-Newhall Electric Light Company, at Chicago; capital stock, \$20,000; incorporators, C. W. Stiger, Walter C. Newhall and Charles A. Buell. Franklin-Richardson Company, at Chicago, to manufacture railway devices; capital stock, \$50,000; incorporators, Philip Clark, K. Franklin Peterson and J. R. Billings. The Universal Power Company, at Chicago; to manufacture motors, cars and railway appliances; capital stock, \$1,000,000; incorporators, Joseph W. Lithgow, A. A. Osgood and G. B. Johnston. Monticello Supply Company, at Monticello; to supply electric light and power, water and steam heat; capital stock, \$15,000; incorporators, W. E. Smith, Reber Huston and H. E. Huston. Chicago Barrel Company, at Chicago; to manufacture barrels and barrelmaking machinery; capital stock, \$500,000; incorporators, Maria E. Beale, Arthur L. Terry and Henry C. Terry. Frech Machine Company, at Chicago; to manufacture machinery; capital stock, \$20,000; incorporators, E. H. Frech, G. B. Avery and William Frech. Dougherty Freight and Grain Car Door Company, at Quincy; to manufacture car doors; capital stock, \$60,000; incorporators, George C. Dougherty, John T. Smith and Samuel Whitsitt. Morgan Park Electric Company, at Chicago; to furnish electric light, power and heat; capital stock, \$25,000; incorporators, F. S. Wheaton, George A. Meech and J. H. Westover. National Novelty Mfg. Company, to manufacture and sell patented novelties, &c.; capital stock, \$300,000; incorporators, Harry Long, Frank W. Hoyt and Carl T. Waugh. Grant Mfg. Company, to manufacture timber, builders' supplies, hardware and general machinery; capital stock, \$30,000; incorporators, John C. Henderson, Charles A. Taylor, John Grant and C. L. Clancy. A license has also been issued to the Hamilton Mfg. Company, at Hamilton, Hancock County, to manufacture and sell agricultural and other implements.

The Hooker-Colville Steam Pump Company, St. Louis, Mo., have recently sold to the Jackson Son Brewery, New Orleans, La., a complete outfit of Hooker pumps, consisting of beer pumps, temperating pumps, boiler feeders, water and air pumps. They have just shipped to the Lone Star Brewery, San Antonio, Texas, two large Hooker plunger pumps, each of which has a capacity of 500,000 gallons per day.

Work has commenced on the construction of the car works plant of the Virginia Car Company at Glasgow, Va. The building will be 905 x 80 feet.

The Virginia Mantel and Grate Company have been organized at Glasgow, Va., to operate the grate and mantel works that are to be moved to Glasgow from Cincinnati by Danziger, Reiner & Strait.

A wire fence factory has been established at Bedford City, Va., by Colgate & Campbell.

Negotiations are reported pending at Radford, Va., between local capitalists and a Pennsylvania syndicate for the establishment of car works at Radford.

At Belleville, W. Va., the Illinois and West Virginia Mining Company, with a capital stock of \$50,000, were recently organized to develop iron and manganese properties in that vicinity. W. E. Stewart is president of the company.

The Martinsburg Mining, Mfg. and Improvement Company have been incorporated at Martinsburg, W. Va., with J. B. Wilson, G. M. Bowers, M. D. Baker and others as incorporators.

The New England City Land and Improvement Company, recently organized at New England City, Ga., have commenced opening iron and coal mines in that locality.

A company are reported organizing at Paris, Texas, to establish an agricultural implement works.

At Cartersville, Ga., the Emerson Mineral Land and Town Property Company have been recently formed to develop mineral lands in Bartow County, Ga.

The Lawrenceburg Land and Mineral Company have been incorporated, with a capital stock of \$1,300,000, to develop Lawrenceburg, Tenn., and establish industries.

The Bain Mfg. Company have been formed at Jasper, Tenn., to establish a wire fence factory and carriage works. The company have a capital stock of \$30,000.

The Barton Agricultural Works, of Sheffield, Ala., are to be removed to Tuscaloosa, Ala., where buildings are now in progress of erection.

The Elkhorn Land and Improvement Company have been incorporated at Pikeville, Ky., by R. M. Fenell, James Polly, James Hatcher and others, for the purpose of opening mines and manufacturing.

The Kelly Plow Mfg. Company, whose works at Longview, Texas, were recently reported burned, will be rebuilt at once, and a department for the manufacture of steel plows will be added.

The Kentucky Title and Land Company have been incorporated at Clay City, Ky., by F. D., E. E. and M. A. Carley, to deal in mineral and timber lands.

It is stated at Ellijay, Ga., that an Eastern syndicate has recently bought large tracts of mineral land near that place and will develop same.

The Safety Package Company, with a capital stock of \$1,000,000, have been incorporated at Baltimore, Md., by W. F. Beasley, T. E. Barrett, George Warfield and others, who contemplate the manufacture of portable safes, locks, &c.

The American Mining and Mfg. Company have been incorporated at Tallapoosa, Ga., to open mines and engage in manufacturing. The company have a capital stock of \$25,000, and the officers are J. C. Kibbey, president, and D. R. Keith, secretary.

The milling supply business of the Lansing Iron and Engine Works of Lansing, Mich., and that of E. F. Cooley of the same place, have been consolidated under the title of the Michigan Supply Company. A new plant is under construction and will be occupied by the company in the spring.

The Cumberland County Wire and Hedge Fence Company have been organized at Carlisle, Pa., with a capital of \$25,000.

The Harris Metal Wheel Company of Toledo, Ohio, find it necessary to increase their present quarters to accommodate themselves to the growing demand for their goods.

The ore dock facilities of the Duluth and Iron Range Railway, at Two Harbors, Minn., are to be doubled to meet the rapidly increasing business of this branch of the company.

The new shops of the Northern Pacific Railroad, at Tacoma, Wash., are rapidly assuming shape, but it will be six months or longer before all the buildings are erected and thoroughly equipped. The building known as the freight or repairing shop is the largest of the group, and will be 350 x 90 feet, and will have track space to accommodate 27 freight cars. The next largest building will be the passenger coach repairing shop, which is 242 x 100 feet. This building is two stories high, and will permit of ten coaches being repaired at once. Adjoining the coach shop structure is the woodworkers' shop 150 x 90 feet, back of which is the boiler and engine rooms. The former is supplied with six boilers of a total capacity of 624 horse-power, and the latter with two engines of 100 horse-power each. The dimensions of the buildings now being erected are: Paint shop 242 x 90 feet; blacksmith shop 190 x 80 feet; oil house, entirely fire-proof, 60 x 43 feet; boiler shop 300 x 80 feet; machine shop 244 x 120 feet, and office and store house 250 x 43 feet. Sixty-five acres of ground have been reserved for the shops, and there will be 11 miles of rail trackage on the ground and in the buildings. When completed the new shops will give employment to 800 men. Arthur McMullin & Co., of Cincinnati, Ohio, are the contractors.

The Miller Bolting and Mfg. Company, recently organized at Columbia, S. C., with a paid up capital of \$40,000, have secured a 10-acre site at that place on which works will at once be erected.

The Eddy Electric Company, at Windsor, Conn., are unusually busy at present, and the works are taxed to their utmost capacity. It has been decided to build a large addition to their building in the spring.

The Hampden Corundum Wheel Company of Chester are to remove to Brightwood, near Springfield, Mass.

The Rhode Island Locomotive Works are building a large passenger engine with cylinders arranged similar to those of the compound Forney recently built for the Brooklyn Union Elevated Road. The driving wheels are 6 feet 6 inches in diameter, and the cylinders are 18 and 28 diameter.

We understand that the Troy Iron and Steel Company are manufacturing Bessemer steel under the Bildt process, specifications for billets by the Washburn & Moer Mfg. Company calling for its use.

## A Western View of the Railroad Situation.

The Chicago *Evening Post* contains the following conservative article on the railroad outlook, which bears evidence of inspiration from exceedingly well informed sources of information:

Although complaints are beginning to be heard of large fallings off in the freight traffic of the Western roads, and the earning of a number of them have been showing a considerable increase for the last two or three weeks, railroad men generally are gradually making up their minds that for the next year or so at least the roads will have a measure of prosperity to which they have long been strangers. This will, of course, be largely consequent on the unification of interests brought about by Jay Gould's recent *coup d'état* on Wall street and by the advance of rates that is sure to follow it. At the same time it is claimed that the changes to be brought about by that event will be by no means of such a startling character as recent reports of the extent and far reaching ramifications of Gould's schemes might lead the public to suppose. The changes to be inaugurated will affect the internal management of the roads a great deal more than they will the public at large.

It is believed that no attempt will be made to advance rates more than 10 per cent. or so for the present, at least, and to such an advance shippers will make no very serious objections, so long as it is made on an equitable basis. Indeed, shippers would prefer to pay higher rates than they have been doing for some time, if they could thereby be assured that all were being treated alike and that tariff rates were not being cut for favored firms and localities. As a rule, shippers have no desire to be considered antagonistic to the railroads. They appreciate the fact that they have interests in common with them, and that if things were allowed to run in their natural channels the well-being of one would mean the prosperity of both. The fact is that the prosperity of many places throughout the country is entirely dependent upon that of the railroads centering in them and having their terminals and shops located there. Hence the bids which the people make to secure the location of railroads and railroad industries in their own localities.

It is quite certain that a great deal of caution will be used by the roads in inaugurating the changes decided upon, and no radical ones will be introduced which are likely to prove unpopular and raise any great amount of public clamor against them, at least until after the State legislatures which were elected this fall have closed their sessions. The make up of these bodies is not altogether satisfactory to the railroads, and they will be very careful not to excite any more hostile railroad legislation. Present efforts will be directed more to getting rates on a reasonably paying basis and then maintaining them there. Secret rate cutting is to be abolished and the reckless competition among the roads for traffic is to cease, but this will be to the advantage of shippers as much as to that of the roads. A few favored individuals who reaped the whole benefit of the irregular practices used may suffer, it is true, but what they lose will accrue to the advantage of the many. On the whole, shippers have no cause to view with alarm the recent changes that have taken place in the situation.

The steel steamship Mackinaw, built on the lakes by the Saginaw Steamship Company and floated through the Canadian canals after being separated into halves at Montreal, arrived safely in New York with 2000 tons of coal from Nova Scotia. Her length is 315 feet, breadth of beam 42 feet and depth of hold 30 feet.

# The Iron Age

New York, Thursday, December 4, 1890.

DAVID WILLIAMS, - - - PUBLISHER AND PROPRIETOR.  
CHAS. KIRCHHOFF, JR., - - - EDITOR.  
GEO. W. COPE, - - - ASSOCIATE EDITOR, CHICAGO.  
RICHARD R. WILLIAMS, - - - HARDWARE EDITOR.  
JOHN S. KING, - - - BUSINESS MANAGER.

## Per Capita Iron Consumption.

Some dangerous fallacies have gained wide currency during the past two or three months, against which the iron trade at least should be protected. Some time since Edward Atkinson of Boston printed "for private circulation" a statistical forecast, which finally found its way into the newspapers and is being widely quoted. Mr. Atkinson commands respect as a statistician and a brilliant writer, but he cannot, we believe, lay claim to recognition as an authority in the iron trade. A far more serious matter is the neglect of important points by one who occupies the position of Hon. Abram S. Hewitt. He is looked up to by the community at large as one whose authority ranks with that of the highest in the land. The statements to which we take exception and against which we desire to warn the iron trade are among those put forward in the address delivered during the meeting of the Iron and Steel Institute in this city. The address was printed in full in *The Iron Age* of October 2, page 535.

After an inquiry into the consumption of iron, Mr. Hewitt is brought to face the question "whether this country can nearly double its production in the next ten years without so seriously increasing the present cost of iron as to restrict the consumption and arrest the rate of progress at which the world is now moving forward." The foundation for the argument which finds its pinnacle in the sentence just quoted is a series of figures which we quote below and which we shall examine critically. Mr. Hewitt gives the following table, showing the comparative rate of increase in population and in the production of iron, and comments on it as follows:

Year.	Production of pig iron. Tons.	Rate of increase. Per cent.	Population.	Rate of increase. Per cent.
1830..	165,000.....	....	12,866,020	32.51
1840..	315,000.....	99	17,069,453	33.52
1850..	564,000.....	80	23,191,876	35.83
1860..	919,770 of 2,000 pounds.....	65	31,443,321	35.11
1870..	1,865,000 of 2,000 pounds.....	105	38,558,371	22.65
1880..	4,295,414 of 2,000 pounds.....	133	50,155,783	30.08
1890..	9,579,077 of 2,000 pounds.....	130	64,000,000	28.00

This table brings out the striking conclusion that the production of pig iron has always increased more rapidly than the population, and

that the ratio is an increasing one. Between 1830 and 1860 the production of iron increased twice as fast as the population. Between 1860 and 1890 it increased four times as rapidly, thus proving that the national wealth continues to grow from decade to decade at a rate of acceleration of which the world affords no previous example. Inasmuch as during all this time we have imported iron in addition to our production, it follows that the consumption per capita has also increased more rapidly than population. In 1855, according to careful calculations which I made at that time, we were consuming iron at the rate of 117 pounds per head; whereas in 1890 the consumption has increased to rather more than 300 pounds per head, the whole of which, for the first time in our history, we are producing within our own borders.

After a review of the development in Great Britain, Mr. Hewitt arrives at the following: "The population in 1900, allowing the same rate of increase of 28 per cent. as in the last decade, will be 82,000,000. A consumption of 300 pounds per head will require 24,600,000,000 pounds of iron, equal to 12,300,000 tons of 2000 pounds. If, in accordance with the accelerated ratio of consumption, which has trebled since 1855, the per capita demands shall rise to 400 pounds, the total tonnage required will be 16,400,000 tons of 2000 pounds, equivalent to 14,800,000 gross tons."

The one serious defect of this whole line of reasoning, which vitiates it, is that pig iron production is taken as a guide in iron consumption. We do not know how Mr. Hewitt determined the per capita consumption of 117 pounds in 1855. In any case it is not a fair basis for comparison, because the railroad mileage was then very small. We shall confine ourselves, by way of example, to an approximate computation of the consumption of the year 1880, in the United States, on the basis of pig iron and old rails and scrap as the raw materials. It is this enormous reserve of old material the neglect of which is so fatal to the conclusions of those who base their figuring on pig iron production.

In the year 1880 we produced in this country 4,295,414 net tons of pig iron, but in the same year increased our stocks by 281,236 tons, leaving an apparent home consumption of domestic pig of 4,014,178 tons. During the census year 1880, which unfortunately does not coincide with the calendar year, the iron rolling mills consumed in manufacturing finished goods 708,534 tons of old rails and 422,282 tons of scrap, a total of 1,130,816 tons. It is safe to assume, therefore, that the consumption of old material in the calendar year was 1,200,000 tons, of which material 694,272 tons was imported in that year. Deducting tin plates and scrap, the imports of iron and steel, crude and manufactured, in 1880, so far as they were enumerated by weight, aggregated 1,240,063 tons. This does not make any allowance for the large quantity of raw material which the imports of partly manufactured or finished goods represent. To counterbalance that we must neglect the quantity of crude and finished iron in bonded warehouses, for which we have not got the figures at hand, but which was known to be large. It is perfectly safe, therefore, to put the equiv-

alent of the imports at 1,200,000 tons. We then have:

	Net tons.
Consumption of domestic pig iron...	4,000,000
Consumption of old material.....	1,200,000
Equivalent of import exclusive of scrap.....	1,200,000
Total.....	6,400,000

This is equivalent to a consumption per capita of 256 pounds. Based on pig iron production alone the figure would have reached only 180 pounds.

It is a more difficult matter to apply the same principles to estimates for the year 1889, because we have no report showing how largely old material entered into the manufacture of iron and steel in that year. We have one guide, and that is the decrease in miles of track of iron rails reported by Poor. His figures show a decrease in 1889 of 1917 miles, which may be estimated to be equivalent to 150,000 tons. Placing the consumption of scrap iron at 200,000 tons, and the equivalent of imports at 420,000, we have a total of 770,000 tons. This, added to a pig production of 8,516,000 tons, would carry the total in round figures to 9,300,000 tons for 1889. This will be swelled this year to 10,000,000 tons, or a per capita consumption of about 320 pounds.

According to this figuring the per capita consumption has increased at the rate of a little more than 25 per cent. Our consumption has therefore increased in the ten years 56 per cent., both the years 1880 and 1890 having been periods of extraordinary consumption, however. The achievement of that decade is that the American iron trade has developed so as to take care not alone of the natural increase in consumption of the country, but also of the 2,000,000 tons of imports of the year 1880. No one will question that if that had not been accomplished, the second half of 1889 would have witnessed a boom all over the world eclipsing that of 1879-80.

But is it safe to hope for similar attainments in the future? We have no such fields to conquer. We have practically the control of our markets, and the increased demand due to the falling off in the supply of old iron rails is over. We may expect that during the next decade old steel rails, which are now appearing in the market in moderate quantities, will come pretty fast to partly supplant pig iron for miscellaneous purposes. The demand for rails for new construction is more and more becoming subordinate to that for renewals. The latter helps pig production but little. During the decade under review our railroad mileage increased from 92,147 to 160,544 miles, or 86 per cent. To continue that rate we would have to build an average of new mileage during the next decade of over 13,000 miles a year. Nothing justifies such an expectation now, and yet the railroads are the largest single consumers of iron.

The conclusion seems to us to be that the history of the past, carefully analyzed, does not justify "the discussion of the question whether this country can nearly double its production in the next ten

years without so seriously increasing the cost of iron as to restrict the consumption and arrest the rate of progress at which the world is now moving forward."

#### The Future of Prices.

Our market reports for the past week have shown a somewhat singular state of affairs. Prices have not only resisted the depressing influences of the financial disturbances, but in notable instances have been advanced by producers. This is especially true of the Western market. But two weeks since the indications were strongly in favor of a serious demoralization of prices. Bar iron was particularly weak, Southern pig iron seemed on the verge of a serious slump, nails were declining as though bottom would never be reached, and almost any business man would have predicted serious consequences if a financial revulsion should add its weight to the forces already at work in the downward direction. But the financial revulsion has not operated as might have been expected. It has interfered with business operations and the hoarding of money has caused some embarrassment, but prices have not generally given way. On the contrary, as above stated, advances have actually been made in some lines, and strong influences are at work which may arrest a serious decline in iron and steel values.

The strength of the situation unquestionably lies in the fact that iron and steel products have not been unduly inflated in value during the past year. It has been a period of extraordinary demand, but prices have been maintained at a range very moderately above the lowest point reached in the preceding year. There was no giddy height reached, such as would cause danger signals to flutter in many directions. Hence but a narrow margin existed to strike cost in case of a decline. That margin had been wiped out in several branches of trade before the financial flurry came with its blight. It was in effect like a frost coming late in the season, after vegetation had by natural changes been prepared for a season of winter weather. A few things are nipped, but no widespread damage is done.

The suggestion may be made that manufacturers are acting in concert with one another to present a firm front to depressing influences, in order to create confidence. But this would hardly be feasible. Looking over the field one sees too many influences of an independent character operating to sustain prices, to encourage the belief that manufacturers have brought about the present condition of affairs through any sort of a general understanding. The steel rail arrangement, the threatened strike of Southern coal miners, the determination of Mahoning and Shenango valley pig iron makers to blow out their furnaces in case they cannot get a reduction in the price of coke, the advance in nails by the Wheeling manufacturers, who have painfully realized that they have been selling below cost, the remarkable demand for bar iron which keeps Western

mills full of work, all these are influences which keep prices from yielding to the shock of financial flurries, and which must be taken into consideration in forecasting the future. They may be regarded as of a temporary character, but so are most influences which govern values. They may change rapidly, and some of them may have lost their force by the time this comes under the eyes of our readers, but beyond all remains the fact that as prices now stand they are not inflated on anything in the iron and steel line. Consumers may be able to buy cheaper next year than now, and the outlook at present seems to favor that view, but there will hardly be enough of a fall in values to make them figure out a serious loss if they were to buy on the existing basis of values.

#### Reconstruction of Transportation Systems.

Revolution in the management of great systems of railway follows directly in the wake of the financial crisis called the "rich man's panic." Many small holdings of stock and securities have passed most unwillingly from their late owners into the hands of heavy capitalists, and these in turn, taking advantage of their opportunity, combine their interests under a single management, forming what is known in common parlance as "another huge monopoly." There are some who attribute this tendency to consolidation directly to the operation of the Interstate Commerce law, and not altogether without reason. That law, to a certain extent, realized the expectation of its authors. Discrimination in rates charged for transportation was made illegal and the declaration enforced to a large extent, and there has been a keener competition between carriers, with important resulting advantages to shippers. But meanwhile the corporations concerned have suffered severely from the loss of net receipts. In many instances an enormous transportation business has been done at a pecuniary loss—stockholders going without their accustomed dividends, and the stocks held by them steadily depreciating from month to month. It was found to be impossible to harmonize. "Gentlemen's agreements" were broken as often as they were made. At last the inevitable crisis came. Under an unusual money pressure, brought about by circumstances to a great extent remote and extraneous, enormous blocks of these same stocks, for the most part held as collateral security for borrowed money, were thrown on the market and sold for what they would fetch. Then came the opportunity for shrewd capitalists with money in hand. The spiders who had been slyly ensconced came forth and secured their respective flies—for example, the Union Pacific passes into new hands and the veteran Adams is succeeded by Dillon in the presidency, and other changes of equal importance are noted.

Through the process of breaking up and reconstruction, now apparently in its beginning, tremendous power is concen-

trated in a few hands, backed by almost limitless capital, available for the execution of long cherished purposes. Of course Jay Gould is the central figure, who naturally comes to the top, now that the violent seething of the financial caldron has measurably subsided; but such names as Vanderbilt and Huntington have frequent mention. The drift of events is further indicated by the accession of Mr. Gould and associates to a control of the great railway system known as the Richmond Terminal, and negotiations are said to be pending looking to a close alliance with the Louisville and Nashville and Chesapeake and Ohio systems in the general combination. It is impossible to foresee the end, but in connection with the now certain dissolution of the Villard improvement schemes and kindred enterprises a radical readjustment of the entire transportation business West and Southwest seems probable, and on a basis more satisfactory to the mercantile classes, who, after all, represent the interests most largely concerned. Meetings and conferences among railroad officials and bank officers are now in order.

#### Basis for Banking.

A Western correspondent makes a suggestion with regard to increasing present banking facilities which seems to have much merit. The national banking system has been so satisfactorily tested by time that any new banking scheme should retain its feature of governmental supervision. As it is hardly likely that the representatives of the people will consent to a perpetuation of the national debt, in order to provide bonds as a basis for banking purposes, the necessity exists to provide some other security to protect circulation. It is obvious that State and municipal bonds would be open to several objections, while bonds of railroad or industrial corporations could not be considered as filling all requirements. If, however, the Government were to be secured by a penal bond, issued by the stockholders of a bank in, say, double the amount of the capital, there could probably then be no objection to the acceptance as security of any kind of property which a government commission would find, on due examination, to possess the requisite value. National bank notes based upon this security could then be issued, as at the present. The nature of the security would be changed according to localities, but banks could be started in any part of the country where they are needed, their number being regulated, as was the case with the old national banks, in proportion to population. Their notes being thus secured would pass freely in any part of the country, while the currency would be expanded to meet the growing requirements of trade. The arrangement thus made would establish a national banking system upon a foundation which would endure until some better methods of paying debts than with actual money can be devised.

### Chicago's Manufacturing Interests.

The growth of manufactures in and about Chicago seems to be accelerating instead of diminishing. The real estate boomer is, of course, a visible presence, participating in the advantages of the situation, and sometimes is so prominent that he creates the impression that the new manufacturing establishments of which he talks so glibly are his own manufacture. But the Chicago boomer is reinforced by actual facts. Very many new manufacturing establishments, and some of them of great importance, have been located in and about Chicago within the past year, and it is estimated that as large an amount of manufacturing capital is seeking a foothold there as at any previous time in the history of the city. The phenomenal growth of the locality continues to surpass even the expectations of those who have the greatest faith in its substantial development. Within the past three years open prairies near the city have been converted into populous districts, and forbidding swamps have been drained and thickly peopled. The rapid increase in population severely taxes the facilities of transportation companies, and strenuous efforts are being made to provide adequate means, through elevated roads, to relieve the congestion.

There must be a substantial foundation for this rapidity of growth, or it would not thus continue year after year. Manufacturers who are asked why they have selected Chicago as the place for their enterprises usually assign one of two reasons. If they are starting new establishments, or have removed to Chicago from points further West, they speak of its advantages as a distributing point. If they have removed from the East, they say they have had to remove West to be near the bulk of their customers, and Chicago seemed to be the best point from which to reach them.

A notable feature of Chicago industrial life is the present tendency of large establishments, doing heavy work, to remove from the heart of the city to the suburbs, thus adding to their growth. The gap which they leave is, however, more than filled up by the increased number of light manufacturing concerns employing many more hands. The increase in the number of these latter enterprises has caused a demand for buildings especially adapted to manufacturing, but capable of being divided to accommodate a number of tenants, power being furnished with the building. The character of such structures has been greatly improved of late. They are no longer rattle traps, cheaply constructed and poorly equipped, but are so neatly built and well finished that their exterior furnishes no clue to the tenantry. Some of the newest manufacturing blocks of this character are from six to ten stories high and are architectural additions to the city. They are very solidly built, supplied with ample power, electric light, elevator service, &c., and are as nearly fire proof as such structures can be made.

Outside of the city proper, the Calumet region has proved to be very attractive for

manufacturers. From South Chicago across the State line, a short distance in Indiana, at least a dozen large establishments have located within the past year, and several more have made arrangements to erect plants next year. This is the favored locality for iron and steel makers and workers. Water and rail transportation and moderate priced land have been the special inducements. In the same district, virtually, are the growing towns of Hammond, Harvey, and other new places which have just been named, but bid fair to be well known in a year or two, if their present excellent prospects of securing large works are realized. Joliet and Aurora properly belong to the charmed circle of Chicago. They have both grown remarkably fast of late, and, to some extent, at the expense of other and less favored localities.

### Iowa's Manufactures Diminishing.

The citizens of Iowa are dissatisfied with the operations of the Interstate Commerce act. They point to quite a number of their most prominent manufacturing enterprises whose buildings and property are now tenantless, and credit the operations of the act with this unhappy result. In nearly every instance the manufacturers have removed to the vicinity of Chicago in order to get the benefit of the transportation facilities of that locality. This is a practical illustration of the truth of the statement made by its critics when national railroad legislation was first seriously discussed, that it would result in a relocation of industries, in which favorably situated communities would reap enormous advantages at the expense of less fortunate sections. It is possible, however, that the Iowa people take too gloomy a view of the situation. They assert that the growth of manufactures in that State, except along the Mississippi and Missouri rivers, has been so seriously checked that its consuming population will diminish and farmers will find a steadily shrinking home demand for their produce. If such a contingency is really impending, there should be enough energy among Iowans to avert it. The manufacturing enterprises whose loss they mourn were evidently not completely adapted to take advantage of any natural resources which may be possessed by the State, or they would not so easily have transferred their operations elsewhere. Other industries, which would in their very nature be rooted in Iowa's soil to stay, should be sought for. It is too rich a State to be retrograding in this age.

Two tunnels of cast iron for an electric railway have been built in London and put in operation for rapid transit. They are 3 miles in length and lie between 40 and 60 feet below the surface of London streets. The tunnels for the up and down lines are formed of cast iron from beginning to end, save where the stations are built, and their diameter is 10 and 10 $\frac{1}{2}$  feet. The tubes are formed of rings 1 foot 7 inches long, made in sections and bolted together. The tunnels were

driven by means of a short cylinder, a trifle larger in its inner diameter than the exterior diameter of the cast iron tunnel lining. This cylinder has a cutting edge, and is forced forward by hydraulic jacks, cutting a circular way into which the lining plates are fitted. The narrow space between the lining and the soil was filled with lime cement forced in under high pressure. In their course the tunnels pass beneath the bed of the Thames and through the bed of an old water course, where loose, wet gravel offered some trying obstacles for the engineers to overcome. The entire cost of the line fully equipped was less than \$3,750,000.

### PERSONALS.

A. A. Arthur, general manager of the American Association, Limited, of Middlesborough, sails for London on the 6th inst.

Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, sails for Egypt at an early date.

By the accidental fall of a scaffolding, on the 26th ult., at the new building of the American Well Works, Aurora, Ill., M. T. Chapman, the president of the company was very seriously injured, and several other men were badly hurt.

Henry Phipps, Jr., the well-known iron and steel manufacturer of Pittsburgh, and member of the firm of Carnegie, Phipps & Co., Limited, of that city, has expressed a desire to donate \$10,000 for the purchase of scientific books for the Carnegie Free Library in Allegheny, Pa. It will be remembered that this library, which cost \$300,000, was presented to that city by Andrew Carnegie. Mr. Phipps has also agreed to defray for three years all expenses of keeping the library open on Sundays from 1 to 10 p. m. It is expected that both offers will be accepted.

### The Edco Electric Street Car.

A test of the Edco electric street car was made last week by the North Chicago Street Railroad Company, which is said to have been very satisfactory in every respect. This street car is operated by a storage battery, which is thus described:

Under the seats in the car are 88 batteries or cells ranged two abreast the whole length of the car. They are all connected by wires and with two motors, which occupy a modest space in the center of the car under the flooring. These motors are like those used in cars run by the overhead system and are built much after the same pattern. Each cell contains two volts of electricity, making 176 in all in each car, and with this power each car is calculated to run from 25 to 40 miles without having the batteries recharged. Seven incandescent lamps are also supplied, three in the car, two on the platforms and one at each end of the roof for headlights. The entire control of the car or train rests with the driver, who manipulates two cranks at the front end. Through them he is able to attain 5° of speed, the slow start and the four increasing grades. Each rate of speed is accompanied by an almost imperceptible shock, as it cannot attain a maximum speed gradually. The driver's left hand wheel is divided into five parts, each movement changing the arrangement of the cells to give the desired results. On the car used in this test there was the regular friction brake connected by an automatic arrangement with a crank, so that the car can be stopped in as short a time as any car, much shorter than a cable train, it is claimed. It is the custom to replenish the batteries after 25 miles have been run so as not to exhaust them too much. A necessary adjunct of the Edco

system is the Edco dynamo which supplies the electricity. The one in use at the car barns in this test was of 210 volts, 30 amperes, with a speed of 1275, enabling it to completely recharge a car in less than three hours. In the improved patterns the batteries can be shifted, and while one is being charged another set is ready for use.

The car made the trip to Lawrence avenue, 3½ miles, in 16 minutes and turned in 18 minutes. M. Pfatischer, an expert electrician, was at the cranks and gave exhibitions of the different rates of speed, and showed to the satisfaction of every one that the Edco car could do what it promised. Several trips were made, and on the last the experiment of attaching a trailer was tried. Both cars were then crowded with passengers, but the battery was powerful enough to perform the service required of it. The Accumulator Company of New York are introducing the car.

## CORRESPONDENCE.

### The Archer Fuel Gas.

To the Editor: In *The Iron Age* of November 13, at page 847, you have an article relating to the Archer gas fuel process and to my presence at Pittsburgh, negotiating with parties there to use my system. The article is correct up to the last four lines, wherein you say: "The fact that coal and slack can be procured in Pittsburgh at very cheap rates will probably operate against the adoption of the Archer system in that city."

The facts are these: Pittsburgh manufacturers have had the benefits of natural gas for several years and have no disposition to go back to coal; even if they did, their furnaces would all have to be reconstructed. Coal could not be used in furnaces constructed for the use of natural gas, while my gas is the equivalent of natural gas in every way, except it is considerably higher in heating power, foot for foot. The Archer gas can now be seen in iron and steel works at Pittsburgh, applied directly in through the natural gas mains and without changes, and doing as good and better work than natural gas, and at a cost less than the present cost of natural gas. I have already closed contracts in such well known establishments as the Pittsburgh Tube Works Company, the Duquesne Tube Works, the Linda Steel Company's Works, Limited, the United States Iron and Tin Plate Company, &c., and numerous other contracts pending for iron, steel and glass and other manufacturing establishments. The Cambria Company, at Johnstown, have also closed contracts with me for the Archer gas to take the place of natural gas in their works.

J. B. ARCHER.  
NEW YORK, November 25.

The fact that during the last year not less than 13,000,000 acres were added to the public domain is a straw in showing the immensity of the nation's area. Of lands actually acquired, about 9,000,000 acres, in North and South Dakota, were secured from the Sioux, and about 4,000,000 acres from the Chippewas in Minnesota. The ratification by Congress of pending agreements will throw open to settlement 600,000 acres in North Dakota, 600,000 acres in South Dakota, 1,095,000 acres in Colorado and 941,000 acres in the new territory of Oklahoma, making a total of more than 17,000,000 acres.

The Pennsylvania Steel Works at Steelton employ 4084 men, and last Saturday \$98,500 settled the pay-roll.

## Washington News.

(From Our Regular Correspondent.)

WASHINGTON, D. C., December 2, 1890.

The reassembling of Congress with so many plans for a strictly business session is not likely to be carried out on account of the immediate launching into a discussion in the Senate on the Election bill. The minority are determined to obstruct all other business if that political measure is seriously pressed. The majority are equally determined to force the Election bill even if the adoption of a rule to limit debate be necessary. In view of these facts, it is very doubtful whether the Senate will be able to dispose of the appropriation bills within the 92 days, Sundays included, left of the session. The party lash and the previous question in the House can hasten legislation if the majority be so disposed, but such parliamentary appliances not being in vogue in the Senate, the opposition to a change of the rules may be made as much a means to delay as on the main question at issue. The effect of all this would be to compel the President to call the new Congress together before its regular day to pass the appropriation bills, and thus open the way to considerable agitation of economic questions in the House in advance of the regular session. Although nothing can be done in the line of action, as the President in calling an extra session always states what business he wishes to bring to the attention of Congress, the agitation will be injurious.

The champions of the Tariff bill in the late session of Congress do not manifest any discouragement on account of the discomfiture in the late elections. They claim that the new Tariff law will be amply vindicated in practice, although it did make a flurry in the prices of articles of domestic use at the untimely moment of an approaching election. The opponents of the measure regard the verdict of the elections as a condemnation, and divers schemes of repeal or reform, as it is called, have already been submitted. Among these is a bill introduced by Governor McCreary of Kentucky on the installment plan of repeal, including in the present list tin plate, cotton ties, agricultural implements, edge tools, binders' twine. The concentrated opposition will be directed at first against tin plate and cotton ties.

It is not likely that any concurrent legislation will be reached on any of these subjects during the term of this Administration, but the effect of the agitation will be to paralyze the development of the industrial energy in these branches. As the new law requires that the product of tin plate in the United States in any one of the next five years must equal the amount of foreign importations, or else at the expiration of that limit the article will be free, it is readily to be seen that the stimulus to be given this branch of industry will be seriously crippled by agitation and uncertainty.

The annual report of the Secretary of the Navy is warmly endorsed by the majority in both Houses, and is very highly commented upon by the politicians and people in general. His vivid picture of the defenseless condition of our great sea coast cities and his portrayal of the practical effect of a belligerent fleet has brought to the attention of legislators the necessity of continuing the increase of the navy. The recommendation of the Secretary to construct 12 battle ships and 20 more torpedo boats for harbor and seaboard defense, besides other heavy vessels, will receive favorable action of the committees on naval affairs. The committees have been called and the naval portions of the message and the Secretary's report will be taken up at once.

## Some Curious Real Estate Figures.

A Chicago real estate dealer, whose operations are very large among people with slender means, has kept a record of the buyers of 600 lots, with the following result:

"In the list of 600 lots the records show that the buyers are cosmopolitan in nationality as well as in nature of employment. I find 254 to be Americans. By Americans I mean those speaking the English language. The lots purchased by them range in price from \$250 to \$1500 per lot. In some 33 cases the entire purchase price paid was in cash, the remainder paying from one-tenth to one-half cash and the balance to be paid on regular monthly payment plan. Sixty five were Germans, who purchased lots ranging in price from \$250 to \$900; of these ten paid cash and the remainder took advantage of the small cash payments and easy terms. Fifty-four were Swedes, purchasing lots ranging in price from \$175 to \$800 each. Fifty-three were Scandinavians or Danes, purchasing property ranging in price from \$200 to \$700 per lot. Forty-six were Irish, purchasing lots ranging in price from \$100 to \$1000 per lot. Three were Italians, purchasing lots for \$500 each. Twelve were French, who purchased lots ranging in price from \$100 to \$500 each. Eighteen were Bohemians, purchasing lots ranging in price from \$300 to \$1000. Eleven buyers whose former residence was England purchased lots ranging in price from \$250 to \$600. Seventeen were Canadians, purchasing lots ranging in price from \$150 to \$700.

"The large number of Americans are either in business for themselves or employed in a clerical line of work. The foreign nationalities in nearly every case are mechanics and the majority of them journeymen, earning from \$12 to \$18 per week. There is one noticeable class of purchasers I find in looking over this record. I find a great many young men who are now employed as clerks in retail or wholesale stores to be purchasing business lots, on which they expect within a few years to open up a retail store or business for themselves. The intentions declared by most of the purchasers are as follows, especially those purchasing on the monthly payment plan: As soon as they have a sufficient amount of money paid on their lots they make application to a building and loan association for money with which to erect their own home. About the same percentage of purchasers of each nationality build. If anything, I believe Germans build sooner after purchasing than do any of the other nationalities, taken as a whole."

The largest contract for machinery that has ever been placed in Greenock, and one of the largest ever placed in Scotland, has, it is said, just been signed by the firm of John Scott & Co., who are to fit the engines and boilers now in course of construction for the British Navy. This extensive order consists of two sets of twin screw, triple expansion engines, each set being of 13,000 horse-power, intended for the Barfleur and Centurion. The machinery must be delivered in two years' time. The same firm is at present building a set of new engines for the British war ship Hercules. These latter are of the single screw, triple expansion type of 8500 horse-power.

The Secretary of the Navy has made a contract with the E. W. Bliss Company, of Brooklyn, for the manufacture of shells of forged steel, under what is known in England as the Cayley-Kortmann process. It will cost \$125,000 to install a plant such as is needed.

# TRADE REPORT.

## Chicago.

(By Telegraph.)

Office of *The Iron Age*, 50 Dearborn street,  
CHICAGO, December 3, 1890.

The special feature of the financial situation is the disposition of railroad companies to postpone payment for supplies purchased. This makes money tight with concerns having a large railroad patronage. General business houses are very slightly affected by the financial stringency, but in point of fact report collections as still remarkably satisfactory. After January 1 it is expected that the railroad situation will very materially improve, as purchasing agents will then be free from the restraint of an annual statement. Already there are indications of a heavy demand for cars and other rolling stock.

**Pig Iron.**—The week has been devoid of heavy sales, but the carload trade is very active and some houses report a fair inquiry for lots of 200 to 500 tons. Foundries are all very busy, except, perhaps, the architectural works, and stocks of Pig Iron in their yards are extremely light. Their need of Iron is shown by the steady stream of carload orders coming in, but they refrain from ordering any considerable quantity, in the hope that they may be able to get bargains from furnaces pressed for money. But unless this contingency occurs soon there will be a forced buying movement, which may hold prices steady. The production of Pig Iron is also likely to be reduced in a short time, rather than increased, as quite a number of furnaces supplying this market are on the eve of blowing out. The Hinkle Charcoal Furnace is now out of blast, with no stock on hand. Prices are a little easier in some directions, but in others are held as firmly as ever. We quote:

Lake Superior Charcoal.....	\$18.50 @ \$19.00
Local Coke Foundry, No. 1.....	16.00 @ 16.5
Local Coke Foundry, No. 2.....	15.50 @ 15.75
Local Coke Foundry, No. 3.....	15.00 @
American Scotch.....	18.70 @ 19.00
Southern Coke, No. 1.....	16.25 @
Southern Coke, No. 2.....	15.25 @ 15.75
Southern Coke, No. 3.....	15.00 @
Southern, No. 1, Soft.....	15.25 @ 15.75
Southern, No. 2, Soft.....	14.75 @
Southern Gray Forge.....	14.25 @
Southern Mottled.....	14.00 @ 14.50
Tennessee Charcoal, No. 1.....	18.50 @
Alabama Car Wheel.....	22.25 @ 23.50

**Bar Iron.**—Orders for cars aggregating some 3000 are coming on the market, which is very good considering the times. This brings out numerous inquiries for Car Irons. Sales of both Car Irons and jobbers' specifications have taken place during the past week. Carload lots of Bars are in active demand. Some of the mills supplying this market have been running short of orders recently and will hail the advent of a renewed demand from the car builders with great pleasure. Quotations range from 1.75¢ to 1.85¢, Chicago, according to the character of the order. Mahoning Valley mills continue to quote 1.70¢ at mill. Jobbers report a continued demand from small manufacturers.

**Structural Iron.**—A heavy trade is still in progress, with consumers pushing the mills for more rapid deliveries. Prices are unchanged. Quotations, f.o.b. Chicago, in carload lots, are as follows: Angles, 2.35¢ @ 2.40¢; Tees, 2.90¢ @ 3¢; Beams, 3.20¢; Universal Plates, 2.45¢ @ 2.50¢; Sheared Plates, Iron, 2.50¢ @ 2.60¢; Steel, 2.60¢ @ 2.70¢; Beams sell from store in small lots at 3.70¢, but Angles and Tees at 10¢ @ 15¢ per 100 above carload prices.

**Sheet Iron.**—There is no special feature to report, the condition of the trade continuing as last stated.

**Plates, &c.**—Dealers are as busy as ever and have made no change in prices. Dealers quote from stock Nos. 10 to 14 Iron Sheets, 2.75¢ @ 2.80¢; Steel Sheets, 3¢ @ 3.25¢; Tank Iron, 2.70¢ @ 2.80¢; Tank Steel, 2.90¢ @ 3¢; Shell Iron or Steel, 3.25¢; Flange Steel, 3.50¢; Fire Box Steel, 4.25¢ @ 5.5¢; Boiler Rivets, 4¢ @ 4.25¢; Boiler Tubes, 45% off for 1½ inch or less; 50% off for 2 to 4 inch.

**Merchant Steel.**—The week has been quiet in this line, railroad orders being especially light in view of the approaching close of the year. Quotations are as follows: Fine Steel, 2.50¢ @ 2.60¢; Open Hearth Spring, 2.65¢ @ 2.75¢; Open Hearth Machinery, 2.50¢ @ 2.75¢; Bessemer Machinery, 2.25¢ @ 2.30¢; Crucible Spring, 3.50¢; Tool, 7¢ and upward; Plow Steel, 2.50¢ @ 2.60¢; Crucible Sheets, 7¢, 8¢ and 10¢.

**Steel Rails and Fastenings.**—Small orders for Rails are coming in steadily, but railroads are holding back their large orders, evidently waiting to see the result of financial disturbances. Makers quote \$31 @ \$31.50. Splice Bars are quiet at 2.05¢ @ 2.10¢ for Iron and 2.15¢ @ 2.20¢ for Steel. Spikes are lower, and can now be had at 2.30¢ from store and 2.25¢, mill shipment. Track Bolts, with Hexagon Nuts, 3.10¢ @ 3.15¢, with factories still crowded with work.

**Old Rails and Wheels.**—Old Iron Rails are neglected by consumers, yet they are not plentiful, and nominal quotations are still high. One railroad company refused \$25 for 500 tons, the offer being made by a dealer. There is some disposition to speculate in them, as dealers think they will be in good demand before the winter is over. Old Steel Rails are very quiet, but are held at the old rates of \$16 @ \$19.50, according to length, and Car Wheels are dull, with \$18.50 asked.

**Scrap.**—Railroads are offering considerable quantities, but consumers are buying sparingly and most dealers are well stocked. Prices are weak and lots can be picked up from those forced to sell at lower than the general quotations by dealers, which are as follows per ton of 2000 lb: No. 1 Railroad, \$20; No. 1 Forge, \$19.50; No. 1 Mill, \$15; Fish Plates, \$22.50; Axles, \$25; Pipes and Flues, \$14.50; Horse Shoes, \$18; Cast Borings, \$8; Wrought Turnings, \$12.55; Axle Turnings, \$13; Machinery Cast, \$13; Stove Plates, \$9; Mixed Steel, \$12; Coil Steel, \$16; Leaf Steel, \$17, and Tires \$18.

**Metals.**—Pig Lead has been quiet at 4.50¢ bid, and transactions have not been over 200 tons. Desilverized Lead is firm at 4.75¢, carload lots; Lake Copper is quoted 17¢, and casting brands 14.50¢, carload lots; Spelter is held in a regular way at 5.90¢, but outside lots can probably be had at 5.80¢. Very little is now doing in this line.

## Chattanooga.

Office of *The Iron Age*, Carter and 9th Sts., CHATTANOOGA, December 1, 1890.

**Pig Iron.**—The question of the strike of the miners is now the principal one agitating the minds of the Iron men of the South. According to present appearances and indications there is little doubt that there will be a general and prolonged strike commencing early in December. Most of the furnaces have been anticipating this, and the result is that they have been very reluctant to sell their Iron. Prices have advanced a little, and if the strike is general prices will no doubt advance as much as \$2, if not more. It is not true that the furnaces have large stocks in their yards. Some of them have no Iron at all to sell, excepting as they make it. Should the threatened strike be general and prolonged, as is now anticipated,

there is no conjecturing what the price of Pig will be in future. The situation is, however, one of grave concern—more so than is generally looked upon by outsiders. The present conditions are very favorable to the furnaces for a strike, however, as they look upon the present state of prices as one in which they are hardly getting a new dollar for an old one, and they think that it would be better policy for the furnaces to lie idle for a while than to run. There is no question that there is a heavy demand for Iron. There has been but very little piling up, and Foundry Irons have been going out as fast as made, and some of the furnaces have been unable to respond promptly to the demand. From private information upon the miners' side of the question the fight will be a long one, consequently any expression of opinion as to how far it will affect prices would be merely guesswork.

## Philadelphia.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Pa., December 2, 1890.

The events of the past few days have not been of an encouraging character as regards the Iron trade. The continued stringency in money is having a paralyzing effect on business, and, until there is a better outlook financially, it is useless to look for improvement in Iron. For the present Philadelphia appears to be the storm center, and, while it is hoped that the worst is over, the prospect is not clear enough to warrant very sanguine predictions as to the near future, although the Iron trade, taken by itself, is believed to be in an unusually solid condition—that is to say, prices are low, stocks are small and there is no undue extension anywhere. There may be a loss of business and a more or less general curtailment of production, but nothing sudden or serious can occur, such, for instance, as in 1873, or in 1881, when prices were more than double what they are to day and stocks in proportion very much heavier than they are now. Hence, while it is impossible to discern anything very bright in the immediate outlook, it is equally difficult to see any grounds for serious uneasiness beyond what we have already indicated. For the present new business is of a very limited character; there is no one trying to sell at anything materially below quoted rates, and still fewer that care to buy anything that they can possibly get along without.

**Pig Iron.**—So dull that there is practically no regular market and no regular prices; yet in the majority of cases prices show very little change. Those who do buy, do it from necessity, and usually want some particular brand, and therefore have no alternative but to pay quoted rates. The bulk of the business for the past two or three weeks has been almost exclusively of this character. But there is Iron for sale at lower prices, how much lower no one knows, and cannot know until bids are made for it. It is safe enough to say that what is claimed to be good Iron can be had at concessions of 50¢ per ton; probably still heavier cuts would be made to any one who can take good-sized lots and pay spot cash or something near to it. But buyers of this kind are scarce, so that it is mere guess work to name any price as a market price. In fact, the whole business is one of private arrangement between buyer and seller; what one might do, another would not do, so that for the present there is no fixed standard for any one. Meanwhile ordinary asking prices for lots delivered in consumers' yards are about as follows:

Ohio Softeners, No. 1x.....	\$19.00 @ \$19.50
Ohio Softeners, No. 2x.....	18.00 @ 18.50
Standard Penna, No. 1x.....	18.00 @ 18.25
Standard Penna, No. 2x.....	16.75 @ 17.00
Medium Penna, No. 1x.....	17.00 @ 17.50

Medium Penna. No. 2x.....	16.00	@	16.25
Virginia and Southern, No. 1x.....	17.00	@	17.50
Virginia and Southern, No. 2x.....	15.50	@	16.00
Standard Neutral All Ore Forge.....	15.00	@	15.50
Ordinary Forge Cinder mixed.....	13.75	@	14.50
Charcoal Car Wheel Iron.....	22.00	@	26.00

**Bessemer Iron.**—In view of the dullness in other departments it will cause no surprise to learn that things are dull in this. There is no price based on actual business, but nominal rates are about \$18 at furnace, but there is no demand worth mentioning.

**Coke.**—The feeling is weak and unsettled, although \$2 is obtained for Connellsville, and about \$1.85 for outside Coke, but lower prices are confidently predicted.

**Steel Rails.**—Nothing doing except in small lots at about \$29.50 at mills. The financial situation is a barrier to any large transactions, although Rails are wanted, and will be taken as soon as the parties see their way to satisfactory settlements. In cases of this kind concessions would have to be made, but in the absence of actual transactions \$28.50 @ \$29 at mills is given as an asking price. A sale of 2000 tons from store in Jersey City was made at \$28.25 a few days ago.

**Steel Billets.**—The market holds pretty steady so far as nominal prices are concerned, say \$29.50 @ \$30, delivered, but there has been very little new business recently. Inquiries are in the market today for several thousand tons and bids made at about \$1 less than quoted rates, but as yet makers have not felt inclined to meet these offers, although they may make a half-way compromise, but even then it is by no means certain that the transactions can be closed.

**Muck Bars.**—Business is quiet, with very little inquiry. One or two sales have been made at \$29, delivered, and although some ask that figure at their mills, buyers seem to get all they want at that figure delivered.

**Bar Iron.**—The market is fairly steady, mills generally well employed for the balance of the year, but nothing of any importance coming in in the way of new business. Some of the country mills are canvassing for orders to begin the year with, but are not making very much progress, as there is no disposition to buy anything that is not absolutely required. For December delivery 1.85¢ @ 1.90¢ is quoted firmly at city and nearby mills, but others a little further away quote from 1.75¢ to 1.80¢, f.o.b. cars, but are not securing anything beyond small lots.

**Skelp Iron.**—There is some inquiry yet, but there is no such urgency in the demand as there was some time ago. Sales of small lots are reported at from 1.95¢ to 2¢ delivered for Grooved, and 2.15¢ @ 2.20¢ for Sheared, but the feeling is somewhat easier, especially for next year's deliveries.

**Plates.**—The feeling is decidedly weaker in this department, and buyers of large lots would find it an easy matter to secure concessions, but business of this kind is not on the market at the moment. There is no scarcity of work for the balance of the year, but beyond that there is very little offering. In some cases manufacturers are becoming quite anxious on this point, so that while quotations show very little change nominally, it probably only requires a firm offer to secure quite liberal concessions. For the present lots delivered in consumers' yards are quoted about as follows :

Iron.	Steel.
Ship Plates.....	2.15 @ 2.25¢
Tank.....	2.15 @ 2.25¢
Bridge Plate.....	2.20 @ 2.30¢
Shell.....	2.40 @ 2.50¢
Flange.....	3.10 @ 3.20¢
Fire-Box.....	3.75¢
	3.75 @ 4.25¢

**Structural Material.**—The position is somewhat similar to that noted in the previous paragraph, although there is proba-

bly a larger amount of work in hand, so that there is less urgency to secure new business. Quotations are therefore about as follows for lots delivered in consumers' yards: Angles, 2.20¢ @ 2.30¢; Sheared Plates, 2.30¢ @ 2.40¢, and from 10¢ to 20¢ more for Steel, according to requirements. Tees, 2.7¢ @ 2.8¢; Beams and Channels, 3.1¢ for either Iron or Steel.

**Sheet Iron.**—The demand is very limited and prices show more or less weakness, according to the character of the order. Small lots command quoted rates, but on carloads the following quotations are subject to some little shading:

Best Refined, Nos. 14 to 20.....	3.00¢	@	3.10¢
Best Refined, Nos. 21 to 24.....	3.20¢	@	3.30¢
Best Refined, Nos. 25 to 26.....	3.40¢	@	3.50¢
Best Refined, No. 27.....	3.50¢	@	3.60¢
Best Refined, No. 28.....	3.60¢	@	3.70¢

Common,  $\frac{1}{2}$ ¢ less than the above.

Best Soft Steel, Nos. 14 to 20.....	3.1¢	@	3.2¢
Best Soft Steel, Nos. 21 to 24.....	3.3¢	@	3.4¢
Best Soft Steel, Nos. 25 to 26.....	3.4¢	@	3.5¢
Best Soft Steel, Nos. 27 to 28.....	3.5¢	@	3.6¢

Best Bloom Sheets, 1-10¢ extra over the above prices.

Best Bloom, Galvanized, discount..... @ 60%

Common, discount..... 62½ @ 65%

**Old Rails.**—The demand is very light, and to effect sales in quantity holders would have to shade prices. The asking rates are \$25 @ \$25.50 at seaboard, and \$26 @ \$26.50 in the interior, but consumers' ideas are nearly \$1 below these figures. Small lots taken at \$25.75 @ \$26.25 at nearby points. Nothing doing at seaboard.

**Scrap Iron.**—There is a good demand, and holders seem to have no difficulty in securing about the following prices: No. 1 Railroad Scrap \$22.50 @ \$23, Philadelphia or for deliveries at mills in the interior \$22.50 @ \$24, according to quality and point for delivery; \$15 @ \$16 for No. 2 Light; \$16 @ \$17 for best Machinery Scrap, \$15 @ \$15.50 for ordinary, \$15.50 @ \$16.50 for Wrought Turnings, \$11 @ \$11.50 for Cast Borings, and nominally \$26 @ \$28 for Old Fish Plates and \$17 @ \$18 for Old Car Wheels.

**Wrought Iron Pipe.**—There is no change in the situation. The present activity will probably continue for some time, as the mills are being pressed to fill contracts, as the jobbing trade is still very heavy. Discounts as follows: Butt-Welded Black, 47½%; Butt-Welded Galvanized, 40%; Lap-Welded Black, 60%; Lap-Welded Galvanized, 47½%; Boiler Tubes, 1½ inches and smaller, 45%; 2 inches and larger, 50%; Oil Well Casings, 50%.

## Cincinnati.

(By Telegraph.)

Office of *The Iron Age*, Fourth and Main Sts., Cincinnati, December 3, 1890.

not relaxed sufficiently to cause a free and marked reaction in business methods and means; on the contrary, the banks are necessarily compelled to maintain strong positions until after the heavy corporate and private annual settlements shall have been accomplished. The temporary withdrawal of funds checks the growth of the new enterprises, or at least holds them in abeyance. This in turn curtails the demand, if not the consumption, of Pig Iron, and prices have declined as a natural result until profits have disappeared and production is being cut down. The market therefore is now in a transitory stage, with prices nominal, and not until the various and opposing forces at work shall have established a decided change or an equilibrium can any increase in trade or any improvement in prices be looked for. At the moment depression is one of the most prominent features of the market. There are reports of liberal sales of warrant Iron at even lower prices than those previously named, but these rumors, for they are little more, lack verification. No large sales of furnace Iron are being made, and even the small orders are few and unimportant. The demand continues to be well distributed over the field of kinds and brands. Quotations are nominal, however. We quote:

**Foundry.**

southern Coke, No. 1 .....	\$15.00	@	\$15.50
southern Coke, No. 2 .....	14.00	@	14.25
Cochineal, No. 3 .....	13.50	@	13.75
Ohio Soft Stone Coal, No. 1 .....	17.00	@	17.50
Ohio Soft Stone Coal, No. 2 .....	16.00	@	16.50
Mahoning and Shenango Valley .....	17.50	@	18.00
Hanging Rock Charcoal, No. 1 .....	21.00	@	22.00
Hanging Rock Charcoal, No. 2 .....	19.50	@	20.50
Tennessee and Alabama Charcoal, No. 1 .....	18.00	@	19.00
Tennessee and Alabama Charcoal, No. 2 .....	18.50	@	19.50

**Forge.**

Gray Forge .....	13.00	@	13.25
Mottled Neutral Coke .....	12.50	@	12.75
Car Wheel and Malleable Irons.			
southern Car Wheel .....	22.50	@	23.50
Hanging Rock, Cold Blast .....	24.00	@	24.50
Lake Superior Car Wheel and Malleable .....	21.00	@	22.00

## Cleveland.

CLEVELAND, December 1, 1890.

**Iron Ore.**—Lake freights are climbing upward, but as the shipping season will be practically over in a week this fact is of little consequence. Quite a number of Ore carrying vessels are already tied up for the winter, but some of the big steel boats will make two more trips to Escanaba. It will be difficult to obtain a reliable estimate of the season's shipments much before Christmas, but the total will be very close to 8,000,000 tons. It seems very probable that negotiations for the purchase of Ore for 1891 delivery will not begin earlier than March of next year, or at least until there have been substantial changes in the Png Iron market.

**Pig Iron.**—A canvass of the local market discloses no new features worthy of special mention. All forces seem to be working toward a narrowing of the trade volume, and the contraction of business is either preceded or accompanied by a further shrinkage of market prices if not of intrinsic value. All profits in speculative holdings have long since been squeezed out, and to those not directly interested it certainly appears that the market drags upon the level of cost of production. This opinion is verified by the fact that several furnaces have blown out or banked up, and not a few more are preparing to do so. The strike of the Coke operators, already alluded to, now enters into the situation as a factor entitled to some consideration, and, followed out to the logical conclusion, means a further contraction of business, but may tend to arrest the steady decline in prices which producers deplore. The money markets, while improving in tone and possessed of larger funds, have

entirely devoid of special features. Prices are fully as dull as ever. The holiday interruption—Thanksgiving—had some effect upon the market, the volume of business transacted during the week being exceeding small. A few scattering sales of Bessemer at about \$16.30 @ \$16.80 are reported. When approached for information dealers only shake their heads and assert that there is absolutely nothing new.

**Mannfactured Iron.**—The mills are still busy and there seems to be the usual amount of business. Common Bar is still at 1.80¢ @ 1.85¢ and Muck Bar at \$30.50 @ \$31. Sheets are in good favor, but are hard to obtain except at prices considerably in advance of regular quotations.

**Serap.**—Prices are not remarkably firm, although a fair amount of business is reported. No. 1 Railroad Wrought is bringing about \$21.50 @ \$22; Old Car Wheels, \$17.50 @ \$18; Cast Scrap, \$15.

**Old Rails.**—The market shows signs of weakness, prices being down to \$26.50 @ \$27 for old Americans with only one or two trifling sales recorded.

**Nails.**—There is no very large amount of business being done, but prices are about the same as last week, \$1.85 for Steel Nails and \$2.30 for Steel Wire Nails.

The Riverside Foundry Company, whose works were recently destroyed by fire, took out a permit for a new foundry to-day. The new structure will be located on Carter street and will cost \$6000.

## Detroit.

WILLIAM F. JARVIS & Co., Detroit, Mich., under date December 1, report as follows: There has been no material change in the situation here during the past week. Buyers are not anxious to place orders except for their immediate wants. However, a larger tonnage has been disposed of than for a few weeks previous. Southern Irons have been most in demand, and a few 500 ton orders have been placed and the usual run of small orders. The closing of navigation on the upper lakes will have an effect on present sales of Lake Superior Charcoal, and until the large stocks sent down are somewhat diminished the demand is not likely to be very large. This has been anticipated, and will therefore have no effect on the prices, which on this grade of metal are being held firm. The demand for Silversides has been only fair, and in some cases slight concessions have been made. For the present, we quote as follows:

Lake Superior Charcoal, all numbers	\$19.50 @ \$20.50
Lake Superior Coke, Bessemer	18.50 @ 18.75
Katabdin (Maine Charcoal)	23.50 @ 24.00
Lake Superior Coke Foundry, all ore	18.50 @ 19.00
Ohio Blackband (40 per cent.)	18.25 @ 18.75
Southern No. 1	16.00 @ 16.50
Southern Gray Forge	14.25 @ 14.75
Jackson County (Ohio) Silvery, Connellsville Coke	18.50 @ 19.00 4.90 @ 5.00

## Pittsburgh.

Office of *The Iron Age*, Hamilton Building, Pittsburgh, December 2, 1890.

The general Iron and Steel business, while not as active as it was a few weeks ago, is all that can be expected under existing circumstances. The number of mills going back from natural gas to coal continues to increase. The following named firms are now using coal: Pittsburgh Forge and Iron Company, Clinton Mills; Oliver Bros. & Phillips, Allegheny Mill; Chess, Cook & Co., Moorhead Bro. & Co. and Painter & Sons. It is stated that the Edgar Thomson Rail Works have been very short of gas recently and will soon go back to coal. The manufacture of artificial gas is only a question of time. Experiments are now being made and as soon as it has been demonstrated a success will go into general use, not only here, but throughout the country.

**Pig Iron.**—There has been no important change in the situation since our last report. Business continues quiet, and there is not likely to be any marked improvement until after the advent of the new year. December is usually a dull month in Pig Iron, as consumers generally make it a point to close the year with as little stock as possible, and the demand in the meantime is likely to continue of a hand-to-mouth character. Valley furnace men continue to aver that unless the cost of coke and transportation is reduced they will blow out after having worked up what ore they have on hand. It is conceded that there is not much of a margin at present prices, but many furnaces are working on contracts made some time ago when prices were much better than at the present time. As compared with those of a week ago, there has been but

little change in prices, and the only sale of any importance reported was a lot of 2000 tons Bessemer at \$16.85, cash, delivered on cars at city furnace. We quote as follows:

Neutral Gray Forge	\$14.75 @ \$15.00, cash.
White and Mottled	14.00 @ 14.50,
All Ore Mill	15.50 @ 16.00,
No. 1 Foundry	17.00 @ 17.25,
No. 2 Foundry	16.00 @ 16.25,
No. 3 Foundry	15.00 @ 15.75,
No. 2 Charcoal Foundry	21.50 @ 22.00,
Cold Blast Charcoal	26.00 @ 30.00,
Bessemer Iron	16.75 @ 17.00,

**Muck Bar.**—There is less inquiry and the market is weaker; may be quoted at \$30 @ \$30.50 for immediate and early delivery, with but few buyers for futures. A number of mills that were buyers, owing to the shortage of gas, having gone back to coal, are now able to make all they want, and some of them will be sellers. Then, in addition to an increased production, consumption is falling off, as it always does at this particular time. The shortage of gas was the chief cause of so much activity in Muck Bar in this immediate vicinity, as many of the mills, not being able to work their puddling furnaces half time, had to go on the market and buy.

**Manganese.**—Continues very dull, and prices are weak and drooping; small sales of 80% domestic at \$70.

**Manufactured Iron.**—There are not so many new orders, nor is it to be expected at this particular time, but the mills are all busy working up old contracts, and as a rule, they will be fully employed until the close of the year. No change in prices: Bars, 1.85¢ @ 1.90¢; Plate and Tank, 2.20¢ @ 2.25¢; No. 24 Sheet, 2.85¢ @ 2.90¢; Grooved Skelp, 1.85¢ @ 1.90¢, with small sales for immediate delivery at 1.95¢; Sheared Skelp, 2.15¢ @ 2.20¢. Those mills running on Skelp have been very busy since early in the summer.

**Nails.**—There is but little doing in Cut Nails, and the outlook is very promising for any immediate improvement. Not only is trade dull, but prices are unsettled and unremunerative. It is claimed that Nails are not worth any more than Nail Slabs, and it is not strange, therefore, that Pittsburgh has abandoned the business. It is hard to quote prices, but they are said to be selling at \$1.80 @ \$1.85, 60 days, 2% off for cash; and Iron Nails are worth as much as Steel Nails. Wire Nails are reported weak. No change in our quotations—\$2.20, 60 days, 2% off for cash—although it is intimated that they can be bought below the price quoted.

**Steel Plates.**—There is a fair business, but no change in prices. Fire Box, 4¢ @ 4.50¢; Flange, 3¢; Shell, 2.80¢; Tank, 2.40¢. A firm here is credited with having just closed a contract with Uncle Sam for 6000 tons of Armor Plate for new vessels for the Navy.

**Structural Iron.**—The mills here continue very busy, and some of them are being crowded on old contracts, as contractors are anxious to close up all the work possible before the winter sets in, when out door work cannot be prosecuted with any advantage. While the monetary troubles and the recent numerous failures have had a tendency to hold back projected enterprises, there is still considerable inquiry, and as matters become settled it is believed a number of large contracts will be given out. No change in prices. Angles, 2.30¢; Beams and Channels, 3.10¢; Steel Bridge Plates, 2.65¢ @ 2.70¢; Universal Mill Plates, Iron, 2.30¢; Refined Bars, 1.90¢ @ 2¢.

**Wire Rods.**—There is not much inquiry, and in the absence of sales we continue to quote at \$39 @ \$40, cash, at makers' mill. However, business is usually quiet at the close of the year, and then the Wire Nail trade is not in a very satisfactory condition.

**Billets and Slabs.**—There is not much inquiry, and prices are weak. We now quote at \$27 @ \$27.50 and \$28, with a sale of 1000 tons reported for January at \$29. Small sales at \$27.50 @ \$28. Some of the mills are well sold up, while others are looking for business. There is not much inquiry for Nail Slabs, and like Billets they are weak.

**Wrought Iron Pipe.**—There is nothing especially new to note; not so much new business, but mills are all busy on Old contracts. Prices remain unchanged. Discounts on Black Butt-Weld, 47½%; on Galvanized do., 40%; on Black-Lap Weld, 60%; on Galvanized do., 47½%; Boiler Tubes, 1½-inch and smaller, 45%; 2-inch and larger, 50%; Casing, 50%.

**Old Rails.**—There has been little or nothing done in Old Iron Rails during the past couple of weeks, and, in the absence of sales, may be quoted nominally at \$27.50 @ \$28. Old Steel Rails continue very dull, and prices may be quoted nominally at \$18 @ \$19. There is not likely to be much inquiry during the remainder of the present year. The offerings of Iron Rails, it is but proper to state, are not large, and the largest seller here, the Pennsylvania Central Railroad, has, it is said, but very few to sell. Here in Pittsburgh there is nothing like the demand there used to be, some of the largest consumers having about abandoned the use of the same.

**Railway Track Supplies.**—There is nothing new to report; new business continues light; prices unchanged. Iron and Steel Spikes, 2.15¢, 30 days, f.o.b. at sellers' works; Iron Splice Bars, 1.95¢ @ 2.05¢; Steel Splice Bars, 2¢ @ 2.10¢; Iron Track Bolts, 2.90¢ with Square and 3¢ with Hexagon Nuts.

**Steel Rails.**—There has been very little new business reported here recently, and no improvement is looked for until after the advent of the new year now close at hand. Carnegie, Phipps & Co. are making some shipments South on old contracts.

**Old Material.**—The demand is less active and prices easier. We can report sales of 300 tons No. 1 Railroad Wrought Scrap at \$22.50, net ton; Old Iron Axles may be quoted at \$29 @ \$30; Cast Scrap, \$15 @ \$15.50, gross; Old Car Wheels, \$18; Cast Borings, \$12 @ \$12.50; Steel Bloom and Rail Ends, \$18.50 @ \$19.

**Connellsville Coke.**—There is no change in prices and demand continues very good; there is a better supply of cars for local trade, but complaint is still made that they are hard to get for through shipment. Coke operators say that there is not much of a margin at present prices, and that they have no idea of making a reduction.

(By Telegraph.)

Business in Iron and Steel continues quiet, but mills generally are busy working up old contracts. Pig Iron continues dull, as also Muck Bar and Steel Billets. Old Iron Rails dull and lower. Sale 200 tons delivered at Youngstown at \$27.50. Wrought Scrap is also lower; \$21.50 is now about best price obtainable for No. 1 Railroad, against sales last week at \$22.50. Demand for almost everything is light.

## St. Louis.

OFFICE OF *The Iron Age*, 214 N. Sixth st., St. Louis, December 1, 1890.

**Pig Iron.**—The market has been absolutely lifeless during the past week. Sales have been on a very small scale, and consumers are not anxious to make new contracts until after the first of the year. The general condition of the market shows some improvement. Prices are not shaded

to any great extent, and furnacemen are refusing trade at prices that would have been accepted two weeks ago. The strike in the Alabama district, which now seems to be an assured fact, is likely to make its influence felt throughout the entire South. The miners demand an increase of 5¢ per ton and certain changes in the regulations, which the operators say mean several cents more. It is difficult to anticipate what the outcome will be, as both sides seem determined not to yield. Should the strike prove of long duration, some startling changes in prices may take place. Consumption keeps about even with production, and it is apparent that the Iron and allied trades are enjoying an excellent business. The demand for No. 1 Foundry is of such a character as to keep ahead of production, and instead of the usual 50¢ a ton difference between No. 1 and No. 2 Foundry, we now quote a clear dollar a ton difference. It is expected that furnaces will shortly be able to overtake their orders and a plentiful supply of No. 1 will then be found.

Southern Coke, No. 1 Foundry, \$15.50 @ \$16.00  
 Southern Coke, No. 2 Foundry, 14.50 @ 15.00  
 Southern Coke, No. 3 Foundry, 14.00 @ 14.50  
 Gray Forge..... 13.50 @ 14.00  
 Southern Charcoal, No. 1 Foundry..... 17.25 @ 17.75  
 Southern Charcoal, No. 2 Foundry..... 16.75 @ 17.25  
 Missouri Charcoal, No. 1 Foundry..... 16.00 @ 16.50  
 Missouri Charcoal, No. 2 Foundry..... 15.25 @ 15.75  
 Ohio Softeners..... 17.75 @ 19.25

**Bar Iron.**—The market is void of any interesting features. Trade continues fairly satisfactory, but prices are slightly tending downward. We quote as follows: Lots from mill command 1.85¢; small lots from store are quoted at 2¢.

**Barb Wire.**—Trade continues fairly satisfactory, and mills are enabled to keep running full time without any accumulation of stock. Prices are fairly maintained, and it is only on very desirable orders that the prices quoted below are shaded. We quote as follows: Painted, 2.80¢; Galvanized, 60¢ additional; car-load lots, 5¢ per cwt. less than above prices.

## New York.

Office of *The Iron Age*, 66 and 68 Duane street, NEW YORK, December 3, 1890.

The principal feature in the markets is the general attitude taken by the railroads in either delaying the payment for purchases of material made or asking for the deferring of deliveries. This is true even of the strongest lines, and may be partially explained by the fact that the majority of them must be accumulating funds to meet payments of interest on bonds due in January. The prospect, therefore, is that the month of December will be unusually dull, so far as new business is concerned.

**American Pig.**—The market is very quiet, but fairly steady. Some of the agents report quite a good run of orders, some of them for round quantities. In spite of the strike in the Birmingham district, we learn that Southern Gray Forge has been offered as low as \$9.75, at furnace. We publish elsewhere a full dispatch reviewing the situation in Birmingham, coming from one of the best informed furnacemen of the district. The general manager of the Tennessee Coal, Iron and Railroad Company, Judge Bond, who is now in this city, states that the company have convict labor enough at the Pratt mines to run the Ensley plant of four furnaces and the one Alice, and that besides it will have a surplus for at least one furnace. The Tennessee furnaces, of course, are running. The coke makers at Birmingham are at work, but of course must stop as soon as the supply of coal gives out. We quote \$17 @ \$18 for No. 1 Foundry,

\$16 @ \$16.50 for No. 2 Foundry and \$15 @ \$15.50 for Gray Forge, standard Northern brands, tidewater delivery. We quote Southern No. 1 \$16.50 @ \$17.25, No. 2 \$15.50 @ \$16.25 and No. 3 \$14.50 @ \$15.

**Spiegeleisen and Ferromanganese.**—In Spiegeleisen the market is absolutely lifeless. In Ferromanganese there are reports of very low offerings, \$62.50 @ \$63.50 being named as the figures on which business might be done.

**Billets and Rods.**—It is reported that several thousand tons of foreign Billets have been bought for re-export in manufactured form at private terms. It is stated that with the present drawback of 99% such Billets cost the mill inside of \$25.

**Steel Rails.**—The market is absolutely lifeless, not a single transaction of any consequence having been reported during the week. While we do not hear of the canceling of any contracts, deliveries are being deferred in a number of cases. The principal trouble now seems to be the difficulty experienced in obtaining money. Collections are said to be very poor, and some of the Rail mills have been stacking up Rails in their yards rather than let them go out of their hands. This course naturally cannot be pursued very long, so that the alternative becomes the closing down of the plant. The Rail department of the Bethlehem Company has been closed down, and we understand that the Pennsylvania Company will stop in January for extensive repairs, which it was originally intended to make last July. The negotiations carried on among the Eastern mills have not yet led to any conclusion. We understand that the first step in them was to be the purchase of one mill. At a meeting held last week in this city the very parties who took the initiative in the negotiations for a pool took ground against the proposition which they themselves had first brought forward. For the present there is a hitch, but it is believed that all efforts to consummate the matter are not abandoned.

**Rail Fastenings.**—Practically no business whatever is doing, and as in Rails, the mills are asked to extend time of payment. The market is weaker, and may be quoted nominally: Angles, 1.70¢ @ 1.75¢; Spikes, \$1.95 @ \$2.05, and Bolts and Nuts, 2.75¢ @ 3¢, delivered.

**Manufactured Iron and Steel.**—Iron-workers report that they are estimating on very little new business and the quiet season of the year has therefore set in. Within the next few days a large bridge for Vancouver is to be given out. We quote Steel Tank Plates, 2.35¢ @ 2.50¢; Shell, 2.60¢ @ 2.80¢; Flange, 2.85¢ @ 3¢, and Fire Box, 3.75¢ @ 4.25¢, delivered, according to quality. Angles are 2.15¢ @ 2.30¢; Sheared Iron Plates, 2.15¢ @ 2.25¢; Tees, 2.65¢ @ 2.75¢, and Beams and Channels, 3.10¢, on dock.

**Old Rails.**—The necessities of the railroads and of some holders, together with the apathy of buyers, have established a lower range of values. Old Rails have been offered in vain at \$22.50 @ \$28, buyers' views being under those figures.

**Warrant Stocks.**—The American Pig Iron Storage Warrant Company report as follows:

	Tons.
Stock in yard, November 25.....	64,800
Put in yard 8 days ending December 2.....	900
Total.....	65,700
Withdrawn 8 days ending December 2..	1200
Net stock in yard, December 2.....	64,500

J. F. Wiechers, 80 Water street, dealer in Scotch warrants, has prepared a table

showing extreme prices, production and stocks since 1851.

Warren, Wood & Co., 115 Broadway, furnace agents, have published a pamphlet descriptive of the Citico, Rockwood, Chattanooga, Trussville, Roanoke, Rockbridge, Douglas, Rising Fawn, Vilas, Melrose, Trim, Mohawk, Star, Tropic, Norton, Martel, Jenifer, Stewart and Round Mountain Pig Irons, which they represent.

## Financial.

An unsettled feeling and irregular markets are the leading characteristics, but the general drift of events is believed to be in the direction of convalescence. The peculiar conditions of the money market are felt in all channels, but the principal inconvenience seems to be felt by those between whom advances are customary, or by that class of borrowers holding doubtful securities. Failures here and there, usually connected with speculative operation, emphasize the need of caution in all branches of business enterprise. The meeting of Congress was promptly followed by the introduction of five bills providing for the free coinage of silver, and this in face of the President's Message deprecating "impulsive legislation" touching this subject. As to the tariff, the President holds that it will be neither wise nor just to open the subject of revision before the present law has had a fair trial. He recommends the proposed international bank and advocates a national bankruptcy bill. In order to meet in a measure the heavy demand for notes of small denominations, Secretary Windom has decided to issue \$10, \$5 and \$1 Treasury notes in exchange for Treasury notes of larger denominations. In regard to the general situation in mercantile affairs, it may be remarked conservative observers take note of the signs of the times with reference to a possible shrinkage in the volume of business and of valuations, in the nature of a reaction from continued expansion. Stringency in the money market at all commercial centers, despite a larger currency circulation than ever before—increased by \$68,000,000 during the last three months—is construed as evidence of impaired commercial credit, upon which all transactions depend. But in commodities and manufactured products alike prices are inclined to drop until readjustment shall come. But it is hardly in the nature of the case that recovery be immediate and complete.

The stock market became strong, but relapsed at the close. On Friday the failure of B. K. Jamison & Co. of Philadelphia, a banking firm with wide connections, was announced, affecting prices, and reaction was caused by the report that the Gould party was selling stock. Another feature was a rise in silver bullion, in prospect of Congressional legislation. On Saturday there was a weak undertone, especially in coal stocks, which become more pronounced on Monday. Gould's plans excited much surprise.

United States bonds closed as follows:	
U. S. 4½%, 1891, registered..	108
U. S. 4½%, 1891, coupon.....	108
U. S. 4%, 1907, registered.....	121
U. S. 4%, 1907, coupon.....	123½
U. S. currency 6%, 1895.....	100

The distribution of merchandise showed some falling off, due in part to the closing of lake and canal navigation. Wheat and corn were heavy, and prices of the leading specialties were usually beyond export limits. Provisions were weak in consequence of the enormous receipts of hog products at Western points. Cotton lower and weak. Sugar steady.

The clearings of 51 cities last week increased 3.1%. New York decreased slightly.

The weekly bank statement showed a gain in surplus reserve of \$292,000, which increases the amount held by the banks above legal requirements to \$383,350. There was a further contraction in loans of \$2,749,100, and a decrease in deposits of \$3,106,800. As yet there are no distinct signs of an easier tendency in the loan market. Discounts, though made rather more freely, range from 7 to 9% for prime paper, and on time loans the best rates are 8% for nine months on first-class collaterals. Rates of domestic exchange begin to favor New York. The December disbursements in payments of interest and dividends will foot up at least \$25,000,000. It is stated that a new bank will be organized in place of the North River, now in course of liquidation.

The market for sterling exchange was weak, nominal rates being reduced to \$4.82½ @ \$4.88. There was a material increase in the supply of both bankers' and commercial bills. Money is much easier in London, but there is no expectation of the lowering of the bank rate. The London *Economist* calls in question the wisdom of the Bank of England in doing more than tiding over a temporary derangement of the credit of Baring Bros.; it would neither "nurse the assets" of the crippled firm nor incur obligations in regard to their mercantile transactions in South America or elsewhere, thus "going beyond their province."

The returns of the foreign commerce of the United States for October present several interesting features. Over \$30,000,000 in cotton were cleared from Southern ports, swelling the total exports to \$99,000,000. Including specie this is less than the corresponding shipments last year, but is more than was generally expected. The result is a favorable balance of trade for the month of \$21,496,890, against \$32,998,571 for the same month of last year. For ten months the survey is less satisfactory, the total imports having been \$729,500,000, or over \$15,000,000 in excess of exports, as compared with a favorable balance of more than \$43,000,000 last year. This is owing to the increase of \$54,000,000 in the imports and to a decrease of \$5,000,000 in the exports. Exclusive of specie the shipments gained \$32,500,000 during the last ten months. It was supposed that the imports would fall off largely under the new tariff, but the arrivals at this port for the first three weeks of November show a gain of \$4,000,000 over the corresponding month of last year.

## Coal Market.

The "thermometer market" in the Anthracite trade, spoken of for some time past, is favorably affected by prospects of zero weather. But something more than a blizzard is needed to restore a buoyant tone. Sales of Coal at auction are among possibilities, reducing the so-called "schedule" to a farce. The only schedule at present worth naming is the October circular, viz.: Broken, f.o.b., \$3.75; Egg, \$3.90; Stove, \$4.30; Chestnut, \$3.95. The small steam sizes are weak. The output continues excessive—866,622 tons for the week ended 22d ult., making a total of 32,000,000 for the year, or about the same as for the corresponding period in 1889. The Reading and Lehigh having ended their fiscal year, mining naturally will be less active, but severe weather will infuse new vigor. The Pottsville *Journal* says, "The truth is that nearly all of the dealers are selling what they can for what they can, without worrying any over what their neighbors are doing. There is no great demand for domestic sizes, Stove alone excepted. Broken, Egg and Chestnut are off from 25¢ to 50¢ per ton, with the stock in many yards increas-

ing from day to day." The Reading Company have given orders for the immediate supply of 5000 cars, which will abate the cry of scarcity. Six thousand of the 8000 coal miners in Alabama are idle. As a result many furnaces will shut down. Work was suspended in the Cameron Colliery, Shamokin, Pa., owned by the Pennsylvania Railroad.

W. L. Scott & Co. suspended work at two of their large collieries, and Reading reduced work in the Schuylkill collieries to three-fourths time, excepting the Lykens Valley district. Reading has nearly completed its extensive new coal plant at Boston.

The Pennsylvania and Cumberland Valley railroads have taken the first important step in the long talked of plan to build a line to the Broad Top Soft Coal region and thence westward along the line of the now abandoned South Penn line. President Kennedy of the Cumberland Valley road has taken out a charter for a line 60 miles in length to run from a point near Shippensburg, on the Cumberland Valley Railroad, to a point near Mount Dallas. The capital stock is \$2,500,000, of which two-thirds is subscribed for by the Pennsylvania road. The Pennsylvania now brings its Soft Coal over its own line from Cumberland to Mount Dallas, but at that point it hands it over to the Reading, which controls the Huntington and Broad Top Railroad.

Bituminous Coal has experienced a reaction to some extent, asking prices being more readily conceded in the absence of full supplies. Quotations are at New York \$3.35, f.o.b.

Sales of Pea are made at \$2.25, f.o.b., and Buckwheat as low as \$1.60 per ton. Prices were stiffened by scarcity of Bituminous, but are again very weak.

At a meeting of sales agents last evening (Wednesday) it was expected that all interests would be harmonized as to output and prices for December, more particularly the former.

## Imports.

### Hardware, Machinery, &c.

Baldwin Bros. & Co., Arms, cs., 6  
Bloomfield, J. C. & Co., Mach'y, cs., 17  
Boker, Hermann & Co., Arms, cs., 28  
Cheeswright, C., Machines, cse., 1  
Cutagar, Wm. & Co., Mach'y, cs., 4  
Commanding Officer, New York, Hdw., cs., 71  
Foster, F., Mach'y, cs., 2  
Hartley & Graham, Arms, cs., 14  
Jordan, A. J., Arms, cs., 2; Anvils, 77  
Lau, J. H. & Co., Arms, cs., 8  
Marshall & Co., Mach'y, cs., 1  
Mecham Arms Co., Arms, cse., 16  
Moriarty & Connell, Rough Gun Barrels, cs., 10  
Morris, L. W. & Son, Mach'y, cs., 4  
Schoverling, Daly & Gates, Arms, cs., 19  
Swarzenbach, Huber & Co., Mach'y, cs., 29  
Sheldon, G. W. & Co., Arms, cs., 25  
Terrell, P., Mach'y, pkgs., 5  
Werleman, E., Arms, cs., 22  
Wiebusch & Hilger, Arms, cs., 16; Hdw., pkgs., 34; Anvils, 134; Chains, cks., 26  
Wyman, C. H. & Co., Arms, cs., 6

## Metal Market.

**Pig Tin.**—During the week under review there has been little movement of prices in either this or the London market. Speculation seems to have narrowed down to a minimum at both points, and the indications are that liquidation resulting from the monetary situation is about ended, leaving the relation of supply and demand the chief feature in regulating prices at the present time. Straits on the spot may be quoted at 20.70¢, net cash, for 10-ton lots and 20½¢ @ 21¢, regular, for smaller quantities. On the Metal Exchange 20.35¢ was bid and 20.80¢ asked at Wednesday's call for December delivery and 25 tons were sold at 20.55¢ for January. Shipments from the Straits during November were 2675 tons to Great Britain and America and 275 tons to the Continent. The October shipments were 2275 tons and 450 tons respectively.

**Copper.**—The market has displayed signs of greater weakness, chiefly through pressure of outside holdings for sale. It is current report that several hundred thousand lb of Lake Superior Ingots have been offered at 16.20¢, and a block of 50,000 lb C. & H. brand was positively for sale at the same price, without finding takers. Early in the week a lot of 25,000 lb was sold at 16½¢, and subsequently resold at 16¢. The latter price, it is believed, would be accepted for additional quantities. While the position of outside is thus fairly well defined, that of the mining companies is still obscure. No prices are openly quoted by the producers' representatives, yet the report again comes in from Boston, and also from the Lake region, that orders have been booked for C. & H. brand for next year's delivery at open rates; otherwise at prices to be fixed later. Other companies are said to have taken or solicited orders at prices to be governed by the C. and H. figures. In other varieties of Copper there is only a moderate business and prices are still irregular, with 14¾¢ @ 15¢ quoted for Arizona and 14¢ @ 14½¢ for common casting brands.

**Pig Lead.**—The lower prices established last week have failed to stimulate purchases in the least. As a matter of fact, the market has been positively dull at the decline, and it is obvious that the heavy importations of foreign Lead are accountable in a great degree for present inaction. At the present time the cost to import foreign is about 4.95¢. Domestic can be had at 4.70¢ for immediate and at 4.60¢ @ 4.65¢ for future delivery. The Western markets have also been dull, with 4.45¢ quoted from St. Louis.

**Spelter.**—The demand has continued moderate, and, while not large or urgent, the offerings for early shipment are sufficient to give the market a slightly weaker appearance. There are sellers of prime Western at 5.95¢, late December shipment. Spot lots are quoted at 6.05¢ @ 6.10¢, the stock being moderate.

**Antimony.**—Outside of the ordinary jobbing movement there has been little doing and prices are without important change. Spot quotations are 17½¢ for Hallett's and 20¢ @ 20½¢ for Cookson's.

**Tin Plate.**—Business has been quiet throughout the week. The inducement of a slight shading of prices for spot stock seems ineffective, despite the fact that makers hold very firm, and futures have received very little attention from either large consumers or dealers. Quotations for large lots on the spot are as follows: Coke Tins—Penland grade, 1C, 14 x 20, \$5.30 @ \$5.35; J. B. grade, do., \$5.40 @ \$5.42½. Bessemer do., \$5.30 @ \$5.35. Stamping Plates—Bessemer Steel, Coke finish, 1C basis, \$5.40 @ \$5.45; Siemens Steel, 1C basis, \$5.50 @ \$5.60; IX basis, \$6.50. IC Charcoals—Melyn grade, \$6.25; for each additional X add \$1.50; Allaway grade, \$5.87½; Grange grade, \$6; for each additional X add \$1. Charcoal Terres—Worcester, 14 x 20, \$5.40 @ \$5.45; 20 x 28, \$6.65 @ \$10.75; M. F., 14 x 20, \$8; do., 20 x 28, \$16.50; Dean, 14 x 20, \$5; do., 20 x 28, \$10 @ \$10.25; D. R. D. grade, 14 x 20, \$4.80 @ \$4.85; do., 20 x 28, \$9.50 @ \$9.65; Mansel, 14 x 20, \$4.90; do., 20 x 28, \$10; Alyn, 14 x 20, \$4.95 @ \$5; do., 20 x 28, \$9.87½ @ \$10; Dyffryn, 14 x 20, scarce; do., 20 x 28, \$10; Wasters—S. T. P. grade, 14 x 20, \$4.60; do., 20 x 28, \$9.37½; Abercarne grade, 14 x 20, \$4.55; do., 20 x 28, \$9.37½.

## New York Metal Exchange.

The following sales are reported:

MONDAY, December 1.

25,000 lb Lake Copper, December.....	16¢
25 tons Tin, ex France.....	20.50¢

## British Iron and Metal Markets.

[Special Cable Dispatch to The Iron Age.]

LONDON, WEDNESDAY, December 3, 1890.

The financial troubles seem to be over, as far as the Iron and Metal trades are concerned, but a fear that further difficulties may arise restrains outside speculation. Warrants, therefore, continue irregular and unsettled, with business in Scotch done at as low as 47/, Cleveland at 44/ and Hematite at 54/2 the past few days. Latest operations showed an improvement to 55/4 on Hematites, but otherwise very little change. Pig Tin improved to £92. 5/, on spot 10/ @ 12/6, owing to realizations by some large holders and absence of outside demand. The bulk of the existing supply is in the hands of strong holders, and with the consumption still good the position is considered favorable for better prices ere long.

Prices for Copper have ruled irregular, but there is no change of an adverse character in the situation of the market. Deliveries continue heavy, having been 1000 tons greater last month than in October, and the visible supply has decreased about 3000 tons.

**Scotch Pig Iron.**—The market remains positively dull, and prices are nominal all through, with quotations given on a few brands only :

No. 1 Coltness,	f.o.b. Glasgow	66/
No. 1 Summerlee,	"	66/
No. 1 Gartsherrie,	"	66/
No. 1 Langloan,	"	52/
No. 1 Carnbroe,	"	52/
No. 1 Shotts,	" at Leith	52/
No. 1 Glengarnock,	" Ardrossan	59/
No. 1 Dalmellington,	"	49/
No. 1 Eghamton,	"	49/

Steamer freights, Glasgow to New York, 1, nominal; Liverpool to New York 10/.

**Cleveland Pig.**—Business has been been slow and prices are unfavorably affected by the decline in warrants. Makers offer at 44/6 for No. 3 Middlesborough, f.o.b.

**Bessemer Pig.**—There is no improvement in the demand and prices unsettled. Makers ask 56/ for West Coast brands, Nos. 1, 2 and 3, f.o.b. shipping port.

**Sptegeleisen.**—No change has taken place, the demand being fair and prices steady. English 20% quoted at 100/, f.o.b. shipping port.

**Steel Rails.**—Demand is light at present and makers are asking firmer prices. Heavy sections quoted at £5 and light sections £6, f.o.b. at N. W. England shipping point.

**Steel Blooms.**—A fair demand continues and prices are steady. Makers quote at £4. 17/6 for 7 x 7, f.o.b. at N. W. England shipping point.

**Steel Billets.**—Sales have been smaller and the demand is moderate, but prices remain steady. Bessemer, 2½ x 2½ inches, £5. 2/6, f.o.b. at N. W. England shipping point.

**Steel Slabs.**—Former prices prevail, the market is steady, with demand fair. Bessemer quoted at £5, f.o.b. at N. W. England shipping point.

**Old Iron Rails.**—There is very little doing and prices are unchanged. Tees

quoted at £3. 2/6 and Double Heads £3. 5/, f.o.b.

**Scrap Iron.**—The market is dull and prices are rather weaker. Heavy Wrought quoted at £2. 5/ @ £2. 6/3, f.o.b.

**Crop Ends.**—The demand continues very slow. Bessemer quoted at £3 @ £3. 2/6, f.o.b.

**Tin Plate.**—Prices are unchanged and the demand continues moderate. We quote, f.o.b. Liverpool:

1C Charcoal, Alloway grade.....	18/9 @ 19/3
1C Bessemer Steel, Coke finish.....	17/6 @ 17/9
1C Siemens " "	17/9 @ 18/
1C Coke, B. V. grade.....	17/ @ 17/3
Charcoal Terne, Dean grade.....	17/ @ 17/3

**Manufactured Iron.**—There is little doing, and except a decline on Welsh Bars there is no change in prices. We quote f.o.b. Liverpool:

	£ s. d.	£ s. d.
Staff. Marked Bars .....	9 0 0	9 0 0
" Common " .....	7 0 0	7 2 6
Staff. Bl'k Sheet, singles .....	8 0 0	8 0 0
Welsh Bars (f.o.b. Wales) .....	6 2 6	6 7 6

**Tin.**—The market very quiet at the close, but steady. Straits quoted at £91. 15/, spot, and £92. 5/ for three months' futures.

**Copper.**—Demand light and prices again rather weak. Merchant Bars sold at £55, spot, and £55. 17/6, three months' futures. Best Selected, £63.

**Lead.**—December is very slow and prices are weak. Quoted at £13 for Soft Spanish.

**Spelter.**—Prices slightly lower and the demand light. Quoted at £24. 5/ for Ordinary Silesian.

### The Birmingham Strike.

(By Telegraph.)

The immediate cause of the strike is that the demands of the miners have been refused by the operators—first, because the market does not afford an advance, and secondly, because the scale and price was fixed and signed for one year last July, and the miners are breaking their contract in asking for what they do now. The miners allege that the operators have not been acting in good faith, that iron had been sold at prices higher than those according to which they had been paid, that they signed the scale only conditionally, and were therefore not breaking the contract. The fact is that the miners have been misled by agitators who subsist on strike and have all to gain and nothing to lose. It is rumored that capital from Northern iron districts is backing the agitators, but this is ill founded and not credited.

The desire of the miners to change the scale from July to December has considerable weight with them, since they expect to get considerable advantage from such a change. There is no real grievance except the general one that the miners suppose that they are not getting the due share of the proceeds from the products of the mines, and for this conception, however false, the capitalist and boomers of the district are entirely responsible. The exaggerated reports of how cheap coal can be mined and iron can be produced, and in general how profitable it is to invest in mining and manufacturing enterprises in the Alabama coal and iron districts, have made their impression on the miners and their leaders as well on investors. They feel justly entitled to a fair share of the wealth they bring to light. In reality there is no well established grievance or well founded demand, and if the true sentiment of the miners could be sounded, only a small minority would be found

favoring a strike now. The agitators and leaders, however, seem to have them all under complete control, and the stand appears to be solid on both sides. The effect on the furnaces in the district will be almost a complete shut down. With the exception of two or possibly three of the Tennessee Coal, Iron and Railroad Company's furnaces, and the two city furnaces of the Sloss Iron and Steel Company, which expect to be run on convict coal, all the furnaces of the district will have to blow out or bank. The De Bardeleben Iron and Steel Company will blow out one and bank three of their furnaces at Bessemer. The operators are firm, the miners seem determined, and a long struggle is anticipated.

**Sale of Duluth Water Power.**—The official announcement was made November 25 of the transfer of the entire stock of the St. Louis Water Power Company, who own the great water power of the St. Louis River above Duluth, to a syndicate composed of Duluth, Eastern and English capitalists. The purchase price is \$1,000,000, and the new company will expend another million in building dams and otherwise improving the power so that it can be utilized. The chief owner in the old company was Jay Cooke, and associated with him were several other Philadelphia and some Western men. The purchasers are E. L. Emery, J. H. Triggs, F. E. Kennedy, J. A. Taylor and Dr. J. A. Smealie of Duluth; F. J. Stevens, Boston; Sumner and Albert Wallace, Rochetser, N. Y.; George W. Lane, Salem, Mass., and Reginald Bolton, London, England; the latter representing other English capitalists. The new company acquires several thousand acres of land which lie on both sides of the river and extend along the Dalles of the St. Louis from Fond du Lac to above Thompson, 8 miles in all. The capacity of the new water power is estimated at 65,000 horse-power. The improvements in the main will consist of a series of dams, the first at Fond du Lac. One of the plans of the company is to supply electric power to Duluth, Superior and all the manufacturing suburbs of those places. John Birkinbine of Philadelphia made an exhaustive inquiry into the value of this water power for the original owners, and suggested methods for its profitable utilization.

The Detroit Dry Dock Company have contracted to build another dry dock, the largest on the lakes.

In the courts, at Pittsburgh, last week, Ralph Bagley received a verdict from the Pittsburgh and Lake Superior Iron Company for \$20,860.76 for salary as president of the company and for money expended.

The Mahoning and Shenango Valley furnace men held an adjourned meeting on November 28, and appointed two committees, one to meet the railroad officials of the roads centering in the two valleys, and the other to discuss the situation with the principal coke producers. The railroad committee consists of J. G. Butler, Jr., H. O. Bonnell and E. A. Wheeler; the coke committee consists of Simon Perkins, Jr., James G. Pierce and Henry B. Shields.

We understand that J. P. Ladd, mechanical engineer of the Pennsylvania Steel Company, at Sparrow's Point, Md., has been forced by ill health to resign.

Witherbees, Sherman & Co. of Port Henry, N. Y., will during the current month carry out a series of trials with different magnetic separators at their concentrating mill.

# HARDWARE.

## Condition of Trade.

The continuance of a good business throughout the country is reported, and jobbers generally are well occupied with orders. These are, for the most part, for comparatively small quantities to complete assortments or to meet immediate wants. There is, however, a large business doing in holiday and winter goods. Manufacturers generally refer to the present demand as moderate, but advise us that they are well occupied in finishing up orders, and are prepared for a quiet month or two which will enable them to get in shape for spring trade. Prices of Shelf Hardware are steady, and the market as a whole is characterized by a fair tone. The weakness in certain staple lines has, however, some effect on the general feeling. There is some complaint in regard to collections, but, considering the recent financial flurry, things in mercantile circles are regarded as in very good condition. The reports which follow give an excellent general impression of the state of business throughout the country.

### Chicago.

(By Telegraph.)

The financial troubles in the East and the little squeeze here have had no effect on the business of the Shelf Hardware jobbers in this market. Orders are coming in very freely from all parts of the West. A large holiday trade is now in progress, and Plated Ware, Cutlery, Guns, Sleds, Skates and Toys of every description are being shipped in large quantities. The demand still runs more toward shelf goods than staple articles. In prices no special change has occurred, but manufacturers are displaying a remarkable degree of stiffness in making new contracts. Jobbers of heavy Hardware report their branch of trade in excellent condition. Collections are very good.

### Boston.

**BIGELOW & DOWSE.**—Trade keeps on the even tenor of its way, notwithstanding the close money market and regardless of the fact that banks are loaning money at 8 per cent. November sales will show but a slight falling off from those of last year's, and remittances are not much below the average. Considering the extreme excitement in the financial world its slight effect on the volume of business is a matter of congratulation. The cold weather makes a lively demand for Skates. But few early orders were placed on this line of goods, and retailers are depending on the jobbers' stocks, which are being depleted rapidly. Very low prices are now being made, and many orders are being placed for March delivery on Barbed Wire, Poultry Netting and Wire Cloth. The extreme low prices on Steel and Wire Cut Nails remain without change. We see nothing at present to interfere with a good trade for the present month.

### Baltimore.

**CARLIN & FULTON.**—Business is probably as good as can be expected at this time of the year, considering the fact that during this month many of our customers take inventory of their stocks, and prefer to add as little as possible to them until that work is completed. The low price of Cotton is interfering very much in the South with both remittances and orders, but we hope that with foreign financial markets in an easier condition, the demand for that great staple will increase, and prices improve by the first of the year. There are no changes in prices of goods worthy of note, and we suppose but few will occur before the beginning of the year.

### Philadelphia.

**SUPPLEE HARDWARE COMPANY**—Since our last report there has been no material change in the volume of trade, but a comparison of the last two weeks, with the corresponding two weeks of one year ago, shows no diminution; and when we take into consideration that trade was then reported as quite satisfactory, the present situation cannot be looked upon as other than favorable. The suspension of the three well known brokers and private bankers in our city, together with others in the Atlantic Coast cities, has naturally caused quite a stir in financial circles, the unfortunate cause being the shrinkage in values of the various marketable and other railroad stocks. The liquidation in stocks, which has been going on, has naturally caused a feeling of distrust in the minds of the officers of our city national banks; this, in connection with the conservative policy, keeping more than the usual reserved balance well in hand. Mercantile paper has been taken with a great deal of caution. Fortunately, there is no present indication that either manufacturers or merchants in the larger cities, or even, so far as we can learn, country towns, have been dabbling in stocks. This, it will be remembered, was not the case a few years ago when a stock panic burst upon us. Hence, so far, the failures in the mercantile and industrial communities have been fewer than one year ago. This is not only the case as reported by merchants in our own city, but the percentage is estimated at 20¢ less than the corresponding time one year ago in the country at large. It is to be hoped that distant merchants may not look upon the present stock ratings as low, and imagine it a good time to deviate from their recently adopted policy, and look upon it as a good time to invest. It would be far better for them to use all spare funds in liquidation of their indebtedness, and then if they have funds not needed in business, it would be far better to invest such funds in their own local property, which is not subject to such fluctuations as cause such trouble periodically.

Neither do we look upon stock as low at the present valuation. We remember

quite well, when there was previous trouble in the stock market, some stocks that are now upon the market were then sold at 30 per cent. less than present quotations. Is it not wise, therefore, for the merchant to "keep from under?" The liquidation that has been going on in the stock market, the trade will agree, has been anticipated in Hardware and other merchandise. Hardware, as a rule, was never so low as at the present time. For a matter of information, we have recently examined an invoice of Hardware sold in 1872, which amounted to \$6006 and a few cents. For comparison, an invoice of the same goods has recently been made out, with the present prices of Hardware, and the value for the same goods was \$2800, much less than one-half the price. The greatest amount in this reduction has been within the last eight years. The liquidation in the price of Hardware has taken place below a point that was ever known, and from the fact that business has been legitimately done, the largest jobbers, as well as manufacturers, throughout the country have come out unscathed.

How differently this would have been had business been done as on the stock boards, and leading goods sold upon a margin. As an illustration, one year ago had 50,000 or 100,000 kegs of Nails been sold on a margin, or 100 carloads of Barb Wire, without the parties ever expecting to take the goods, while, as a rule, the mercantile and manufacturing industries have shown themselves quite able to take care of themselves during the present money stringency. Collections may be reported as fair. We think if a realizing sense of the situation had been taken by those who are careless in making remittances there would then be no cause for complaint of receipts. The purchasing power of our country has never been so great. The volume of currency has gradually increased, and goods have never been so low in price. Customers report no overstocks on hand, and, as a rule, report to us that their business during the year 1890 has been quite satisfactory. Owing to the mild weather, certain winter specialties have not gone off as usual. Especially is this the case with Skates, Sleigh Bells, Ice Creepers, Snow Shovels, &c.

The sale of Meat Cutters, we think, has been unprecedentedly large. Indeed, of one particular make the manufacturer has been several thousand behind his orders during the entire fall, thus the distant merchant has been unable to get this make of Meat Cutter for his immediate wants. Wire Nails have been in active demand, considering the lateness of the season, which demand still continues. The low price in Barb Wire has, we think, induced many persons to place their orders in advance of their wants. The end of the building season is fast approaching. Favorable weather has permitted work to progress regularly this fall, and fewer build-

ings will remain unfinished this winter than for many years past. Trade in this line of Hardware has been especially good during the past year. The stock of Hardware, especially in Locks and Knobs, recently being placed in buildings, has been generally of a far better quality and handsomer in appearance; handsome Broze or Oxidized Silver, now used on the lower floor of houses of a fair valuation, has taken the place of the the cheaper grades, and is being supplied at ridiculously low prices. A prominent builder in our city states that he thinks it strange the goods can be manufactured for the price sold.

#### Omaha.

**LEE-CLARKE - ANDRESEN HARDWARE COMPANY.**—The general situation remains much the same as noted in our last report. The volume of business shows a slight decrease since the late election or "land slide." Prices, as a rule, are well maintained, and the tone of the market is remarkably steady. Stocks in the hands of jobbers are not particularly heavy, and no movement is apparent this year to unload surplus by attractive prices, commonly the case as the season for stock taking approaches. Exceptionally clear and balmy weather has held up sales of Builders' Hardware in a very satisfactory manner, and the ghost waltz of disaffected Redskins hereabout has superinduced a heavy demand for Arms and Ammunition. Quite a number of inquiries are being received for spring goods, such as Wire Cloth, Screen Doors, Steel goods, &c., and a fair amount of orders for these goods have already been booked. We think the winter trade will average well up with previous seasons, and the signs point to a brisk and heavy demand for Hardware "before the robins nest again."

#### San Francisco.

**HUNTINGTON-HOPKINS COMPANY.**—Trade, particularly in the country, is good; in the city somewhat quiet, owing in a measure to the decrease in real estate transactions and in building. Collections good. We account for the good country trade at this season of the year as being the result of the long continued spell of pleasant weather. At this writing we have had no rain to speak of, while at this time last year we had a superabundance. As soon as the rainy season sets in trade will decrease.

#### Portland, Ore.

**FOSTER & ROBERTSON.**—Ninety days of delightful fall weather, with scarcely ten days of rain, is a remarkable record for a State in which it is said to rain 13 months in the year. Certain it is that all forms of outdoor work have gone on steadily, and are still going on without interruption, and from anything in sight it looks as though this same activity might continue for some time to come.

With the exception of the slight decline in the price of Rope, which is now held at  $15\frac{1}{2}\%$  base for Manila and  $10\frac{1}{2}\%$  base for Sisal, there has been no change in prices worthy of note. There is not the slightest falling off in the volume of trade since

our last letter. Orders are numerous, both from travelers and by mail, and are generally well assorted. The trade in Tin Plate, Stamped and Pieced Tinware, Iron Clad Enamelled Ware, Sheet Iron, Elbows, &c., has been especially active, the supply constantly falling short of the demand. The same may also be said of Pumps, Gas Pipe and Fittings. Crosscut Saws, Axes, Peaveys, and other Loggers' and Lumbermen's Supplies have been and are moving quite freely, which indicates a goodly state of activity in that important industry.

The inability of the railroad companies to move in a satisfactory manner the immense crop of grain, resulting in crowded warehouses and elevators, has had a discouraging effect on the market; and prices are now so low that farmers are unwilling to sell. This is having its natural effect on collections, which have fallen off very materially since the first of the month. However, we are in hopes that the next few weeks will see a change for the better in this matter. It is probable that the severe criticisms now being heaped upon the railroad company by the newspaper press throughout the entire Pacific Northwest and the curses loud and deep from the public in general will have a moving effect upon the railroad management, and we shall gain the desired relief.

#### Louisville.

**W. B. BELKNAP & Co.**—As the financial crisis seems to have blown over, so there is a somewhat better feeling in the iron market. It is surprising how little it has been disturbed by the general agitation in the large money centers. Prices have varied not more than usual at the same season, which shows how near they were to hard pan all the time. The greatest factor in the maintenance has been the large volume of business in the country. Our fall business has never been better in the long run, and it is about the longest run on record with us. The approaching holidays scarcely seem to affect the demand for heavy goods, while of course the lighter shelf stock, such as recommends itself for Christmas trade—*e.g.*, Fancy Cutlery, Carvers, Plated Ware, &c.—is moving with exceptional freedom. Stocks which were supposed to be ample have been thinned out and the sorting up process is already active. There is besides anticipation of the plowing season, which begins after the first of the year, and Trace Chains, Hames, Back Bands, &c., are demanding some attention for themselves. Altogether, the year closing we think will be a prosperous one to all except those who have indulged too heavily in speculation, and the promise for 1891 is not a whit less good.

With a view of cleaning up their order books, we suppose, some of the rolling mills are resuscitating orders in which vitality was supposed to be extinct. It is astonishing what can be raked and scraped out of old order books with an undeniable flavor of antiquity to them when prices justify. A remonstrance against these long delayed shipments is generally

met with a not altogether novel suggestion that "the goods should have been canceled if not wanted." It is quite an interesting question as to just what constitutes unreasonable delay. There is a strong temptation to postpone low priced orders in favor of high priced while a boom is on, but just how far this propensity should be indulged is something that every change in the market brings up. To see goods arrive too late, on which a handsome profit might have been realized by delivery within reasonable time, is one of the trials of business life. The too familiar rubber stamp of "Order taken subject to delays, accidents, or causes beyond our control" will some of these days be discarded, as those concerns which, when they agree to deliver goods of a certain quantity and kind within certain dates, will do it no matter what the cost, rise to a proper eminence of popularity and prosperity. Another rubber stamp destined to be obliterated as business methods improve and as ideas of obligation grow better defined is that of "Order taken subject to prices ruling at date of shipment." This is of so indefinite a nature that it necessarily vitiates any contract. There is a correlative to both of these one sided propositions which will force recognition for themselves at no distant day.

#### Cleveland.

**THE W. BINGHAM COMPANY.**—The financial difficulty which started in Europe and spread to this country has not seemed to affect trade in this locality in the least. November closes with a record which compares very favorably with the other months of the year and the orders cover a larger variety of goods than is usually the case so late in the season. Spring orders for Wire of all kinds, Wire Cloth, &c., are being more freely placed, buyers showing confidence that prices have touched bottom. The retailers whose locations are such that they can handle holiday goods advantageously are getting them out, and some very elegant displays are made. If one stops to think of it, there are a great many novel and useful, as well as handsome, presents that can be bought in a Hardware store. Collections are fair, but the money market has not eased up any as yet. We have noticed the fact for some time that was called to the attention of the trade by the letter from our Louisville friends in your issue of the 20th, and that is the extreme slowness in delivery of goods by the railroad companies. We are well aware they have had immense volumes of freight to handle, but if they have not cars enough to do their business promptly they should get the same, and their advanced rates and increased business will warrant them in doing so, without decreasing to any appreciable extent their dividends to their stockholders.

#### St. Paul.

**FARWELL, OZMUN, KIRK & Co.**—Condition of business since last reported remains about the same. Orders from the country are quite large in numbers and quantity of goods ordered, keeping our

force very busy. Volume of trade is larger than at the same time last year, and would be still better if we were having seasonable weather. It is very pleasant to one's feelings to have sunlight and balmy days, but in this section it does not make dealers having heating stoves, woolens, overcoats and winter goods feel very happy to have this condition of affairs. A little cooler weather, with some snow sufficient for sleighing, would stimulate business very materially in all lines. If we get good snug winter weather by December 1 dealers will not suffer. There has been very little change in prices since last report. Collections have felt the stringency of the Eastern money market to some extent, and the drop in the price of wheat has prevented farmers selling as freely as they otherwise would, but on the whole we have to report very fair receipts for this season of the year. We think an improvement in this direction will be experienced as soon as confidence is restored.

### Prices.

**Cut Nails.**—The manufacturers are unwilling to accept orders at the extreme prices which are now prevailing, except for early delivery, and are naming slightly higher figures for January and February delivery. Prices have not materially changed since our last review, but the prices now prevailing indicate something of weakness, and are slightly lower than those ruling a week ago. The prices of Steel Nails are very nearly the same as for Iron. Small lots from store are quoted \$1.85 to \$1.90 for Iron and 10 cents more for Steel. Round lots, f.o.b. New York, are quoted \$1.80 for Iron and 5 or 10 cents additional for Steel. Owing to the low prices which are ruling, there is a great deal of activity for this time of year.

**Chicago, by Telegraph.**—The local market for Steel Cut Nails has not improved. Sales by manufacturers are light. Jobbers quote \$1.85 to \$1.90 from stock.

**Barb Wire.**—During the past week some low quotations have been current. It is understood that 3 cents per pound for carload lots is named by prominent mills in the Pittsburgh district for Galvanized Four-Point at mill. Less than carload lots command the usual advance. The price for small lots from store in New York is 3.25 to 3.30 cents for Galvanized Four-Point. As usual at this season, there is comparatively little doing.

**Chicago, by Telegraph.**—Manufacturers are having increased sales, and report an improving outlook as far as volume of business is concerned. They quote carload lots, Chicago, at 2.7 cents for Painted and 3.2 cents for Galvanized. Local jobbers are finding the demand very light, and prices are a little lower. Small lots are selling at 2.8 to 2.85 cents for Painted and 3.4 to 3.45 cents for Galvanized.

**Wire Nails.**—During the past week or ten days there has been considerable activity in the Wire Nail market and a good many Nails have been sold. \$2.15 is still named as a common price for fair lots at

leading Western mills, but this price is sometimes shaded on desirable orders. Some of the Eastern mills are refusing to meet this figure. It will thus be seen that on the whole the market has not gained in tone since our last review, and while a good many Nails have been sold the market is irregular and low. Small lots from store in New York are sold at \$2.40 to \$2.45.

**Chicago, by Telegraph.**—Manufacturers are either well supplied with orders or else have determined to get better prices, as large buyers have been unable to shade \$2.30 in Chicago in the past week. Contracts have also been refused for next year, sales being made now for immediate delivery only. Retail merchants are apparently but lightly stocked, as they are ordering for immediate shipment. Jobbers quote \$2.45 for small lots and \$2.40 for car loads.

**Shot.**—Under date December 1 the Eastern prices of shot were reduced to the figures named below, which are subject to discount of 2 cents per 25-pound bag if paid within five days from receipt of bill:

Drop Shot, 2 lb. (bag) 25 lb. ....	\$1.48
" " 5 " " 5 " " 35	
Buck and Chilled Shot, 2 lb. (bag) 25 lb. ....	1.73
" " 5 " " 5 " " 40	

Dust Shot, (bag) 25 lb. .... 2.00

**Lead Pipe, Sheet Lead, &c.**—Under date November 26 the following revised quotations on Lead Pipe, Block Tin Pipe, Sheet Lead, &c., are announced:

Lead Pipe, 2 lb. ....	7½¢
Block Tin Pipe, 2 lb. ....	40¢
Sheet Lead, 2 lb. ....	8½¢
Tin Lined Pipe, 2 lb. ....	15¢

**Glass.**—The meeting of the American Window Glass Company, held at Chicago, November 25, resulted in an adjournment until December 30. No business of importance is reported as being transacted. Prices remain unchanged. There is nothing further to report in regard to the forming of a Glass association by the New Jersey, Philadelphia and Baltimore Glass men.

**John Wilson's Knives.**—Hermann Boker & Co., 101 and 103 Duane street, New York, have made a further revision in the list prices of John Wilson's Butchers' Skinning and Sticking Knives, with Beechwood Handles, slightly reducing the list on 5½, 6, 10 and 14 inch Knives. The revised list is as follows, which is subject to the regular discount of 25 per cent.:

Beechwood Handles				
Nos. 026	26	27	28	
4½	5	5½	5½	inch.
\$2.10	2.30	2.50	2.70	per dozen.
Nos. 29	30	43		
6	6½	7	inch.	
\$3.50	3.90	4.50	per dozen.	
Nos. 44	45	46	47	
8	9	10	11	inch.
\$5.75	6.90	8.50	11.10	per dozen.
Nos. 48	49	86		
12	13	14	inch.	
\$12.60	14.60	18.00	per dozen.	

**Steel Goods.**—Under date December 1 Batcheller & Sons Company, Wallingford, Vt., announce the withdrawal by them of all quotations on Steel Goods. They state that they have booked orders for all the goods which they will probably be able to produce during the current season, which ends July 31, 1891. They add that all unfilled orders or contracts expire on that

date unless the non-fulfillment is by their fault. This is an indication of the excellent condition of things in this line, and it is thought not unlikely that other manufacturers will take similar action.

### The Branding of Imported Goods.

There has been some question in regard to the interpretation of the provision of the new Tariff act, which in Section 6 requires all merchandise imported after March 1 to be marked, stamped, branded or labeled in legible English words "so as to indicate the country of their origin." The question is as to whether the use of a well known city in a foreign country would be sufficient, as, for example, Sheffield, Birmingham, Berlin or London. In order to receive an official opinion on the question E. La Montagne & Sons, of this city, addressed the following inquiry to the Secretary of the Treasury:

NEW YORK, November 18, 1890.  
Hon. Wm. Windom, Secretary of the Treasury, Washington, D. C.:

SIR.—In reference to Section 6, Tariff law, "that all goods are to be marked, &c., in legible English words so as to indicate the country of their origin," will you kindly inform us whether it will be necessary to label, &c., with full name of country, as for instance "Bordeaux, France," or would the city alone, "Bordeaux," be sufficient to indicate the country of origin?

Would "London," "Paris," "Bordeaux," "Cognac," "Cadiz," "Oporto," be sufficient to label goods from the various places without adding "England," "France," "Spain," or "Portugal?"

Awaiting your reply, we are respectfully yours,  
E. LA MONTAGNE & SONS

The reply was in the following terms, and expresses the opinion that the law should be so interpreted as to call for the name of the country and not merely the name of the city:

TREASURY DEPARTMENT.  
OFFICE OF THE SECRETARY.  
WASHINGTON, D. C., Nov. 22, 1890.  
Messrs. E. La Montagne & Sons, 53 Beaver street, New York, N. Y.:

GENTLEMEN.—In reply to your letter of the 18th inst., the Department has to say that, under the provisions of Section 6 of the act of October 1, 1890, the labeling of merchandise you mention with the name of the city or place of production is not sufficient, the law requiring that on and after the 1st of March, 1891, the marking, branding, stamping or labeling must indicate in legible English words the *country* of origin. Respectfully yours,

O. F. SPAULDING, Assistant Secretary.

Under this interpretation it would appear that the safest course would be to have Cutlery, Guns, Anvils and other branded Hardware articles distinctly branded with the name of the country of their origin. This would necessitate a modification in the branding of nearly all such goods, as even in cases where Sheffield or Solingen or other place of manufacture is given in the brand, the country of origin, whether England or Germany, is only in rare instances, so far as our observation goes, given. Some importers are, we are informed, giving instructions for such a branding of goods as will com-

ply with the strictest interpretation of the law. In Pocket Cutlery, for instance, which is at present stamped "Sheffield," they have ordered that "England" be put on the reverse of the principal blade. There is not, however, entire uniformity of opinion in regard to what will be actually required in this regard, and we understand that some leading Pocket Knives will still be stamped simply "Sheffield," while the label will be made, "Sheffield, England." A semi-official opinion has been, we understand, expressed that this would in such a case be probably construed as complying with the requirements of the law. It would, however, appear that such an interpretation is hardly consistent with the spirit of the law, the object of which is evidently to inform the consumer in regard to the country in which the article is made.

In this connection the following correspondence with the Treasury Department will be of interest. Under date November 6 an inquiry in regard to the method of indicating on the article the name of the country was sent to the Secretary of the Treasury in the following terms:

1. Must an article which is branded have the English words indicating the country of origin branded upon it, or will a printed label or some other method suffice?

2. Must an article which is both branded and labeled be both branded and labeled with English words indicating the country of origin, or will a label suffice?

The reply of O. F. Spaulding, Assistant Secretary, under date Washington, D. C., November 17, 1890, was in the following terms:

In reply to your letter of the 6th inst., the Department has to say that in its opinion the requirements of Section 6 of the act of October 1, 1890, will be fully complied with if any articles which have heretofore been marked, stamped, branded or labeled in any manner shall after the 1st of March next be either "marked, stamped, branded or labeled in legible English words, so as to indicate the country of their origin;" in other words, it will be sufficient if the articles are plainly marked in any one manner as prescribed in said section.

This interpretation, it will be observed, is not inconsistent with the one given above, being, in effect, the opinion that every article must bear the designation of the country of its origin, and that an article which is both branded and labeled need not contain the double designation of the country of origin. It will thus be seen that so far as it applies, for example, to Pocket Cutlery, it holds that each Knife must have on it the name of the country in which it was made, and that Anvils, for example, need not be both labeled and branded.

It is a question of considerable importance to importers of Cutlery and other goods to adopt in the branding and labeling of their goods such a method as will permit their entrance without trouble or litigation. Unless exceedingly difficult it would seem to be the part of wisdom to have the goods marked so as to conform with the strictest interpretation of the law.

## Trade Items.

**A** CHANGE IS ANNOUNCED in the title of the Gibbs Lawn Rake Company, Canton, Ohio, which recently became the Gibbs Mfg. Company. The company have for a long time been making other articles besides Lawn Rakes, and as they expect to add to their line from time to time it was decided to add a more appropriate and expressive firm name. The members and management of the company will continue as heretofore. Their advertisement relating to Lawn Rakes appears in another part of this paper.

JAMES C. CONNER, a prominent hardware merchant of Evanston, Ill., died on November 26. He was born in Ireland, but had been a resident of Evanston for 35 years. He was also a contractor and builder, and built many of the handsome residences for which Evanston is noted. His hardware store was designed by himself, and embodied many excellent features which were illustrated in our columns in 1887.

A. F. SHAPLEIGH HARDWARE COMPANY, St. Louis, Mo., finding their present quarters inadequate, have leased the new Boatmen's Bank Building, corner Fourth and Washington avenues, and will occupy it about January 1. The Boatmen's Bank has reserved part of the first floor for their own use, the balance of the building, which is seven stories in height, will be occupied by the A. F. Shapleigh Hardware Company.

PIKE MFG. COMPANY, Pike Station, N. H., have been appointed American agents by Donald & McPherson, Glasgow, Scotland, for the well-known Scotch Water of Ayr Stone. John H. Graham & Co., 113 Chambers Street, New York, who are agents for the Pike Mfg. Co., have a large stock of these Stones on hand, including Engravers', Lithographers' and Curriers' Blocks and Jewelers' Stones, as well as Water of Ayr Carpenters' and Axe Stones.

C. E. JENNINGS & CO., 79 Reade street, New York, devote their page advertisement in this week's issue to Rules, Tool Chests, Cleavers, Bung Borers and Box Scrapers, illustrations of which are given.

UNDER DATE DECEMBER 1, announcement is made of the organization of the Thomas Laughlin Company as successors to Thomas Laughlin & Son, Portland, Maine. It is also stated that they are now enlarging their plant to nearly triple its present capacity. Their illustrated catalogue is in the printers' hands and will soon be ready for distribution.

ROBERT M. DIAZ COMPANY, successors to Robert M. Diaz & Co., 292 Washington street, Boston, Mass., announce that having made a satisfactory settlement of their affairs they will continue business at the old stand. They state that they have in stock a full line of the following goods, for which they are headquarters: Ulster Knife Company's American Pocket Knives, J. Wiss & Son's American Shears and Scissors, Medford Fancy Goods Company's Dog Collars and Furnishings, Long Reach Skates, John Russell Cutlery Company's Table Cutlery, Carvers, &c., Putnam Cutlery Company's Bread and Shoe Knives, Joseph Barnard & Sons' Scissors, and Benj. F. Badger & Co.'s Razor Straps, &c. In this connection the advertisement in this issue of the Keene Mfg. Company, Keene, N. H., for whom the Robert M. Diaz Company are agents, relating to Long Reach Club Skates, of which an illustration is given, will be of interest. They have a complete assortment of these goods in stock and are in a position to make prompt shipments. It will also be observed that R. M. Diaz Company, in their advertisement among the Special

Notices, call attention to a lot of 10,000 pairs of Long Reach Club Skates, on which they are prepared to make a special price for immediate orders. They suggest that the trade write or wire for quotations, and for convenience publish a telegraph code relating to these goods.

KELLEY, MAUS & CO., 184 to 190 Lake street, Chicago, have issued an illustrated catalogue and price-list covering the line of Heavy Hardware which they handle, embracing Iron, Steel, Nails, Carrage Hardware, Cloths and Trimmings, Wagon and Carriage Woodwork and Hardwood Lumber, Blacksmiths' and Machinists' Supplies, &c. The second page of the catalogue presents views of the firm's general offices and storeroom on Lake street and also of their warehouse and lumber yard at Blue Island avenue and Paulina street. An alphabetically arranged index precedes the body of the catalogue. An immense variety of goods is shown, which are handsomely illustrated. The concluding pages of the book are devoted to interesting tables of weights of various materials. There are nearly 600 pages in the catalogue, and it is substantially bound in heavy boards, covered with cloth. The firm state that all their customers are entitled to one copy of this catalogue. Should others desire copies they are furnished at \$5 per copy.

REFERRING to a notice in our issue of the 27th ult. of the large catalogue recently issued by the Sligo Iron Store Company, St. Louis, Mo., a typographical error occurred, substituting Stove for Store. Though probably not misleading to many of our readers, the house being so largely and favorably known, the mistake is an annoying illustration of the perversity of types. Those who are favored with a copy of this book will notice that a new departure has been made in its arrangement, from the old conventional lines upon which catalogues of Heavy Hardware have heretofore been based, in the classification of the goods.

THE OFFICE OF THE C. M. Shirk Mfg. Company, 112 and 114 Lake street, Chicago, has recently been finished in hard wood in the patterns used for their Refrigerators, exhibiting in a striking manner the beauty of the designs and ornamentation employed. In addition to Refrigerators, they manufacture the North Star Oil Heater, using oil for fuel, which is converted into gas, and a cut of which occupies the last page of the catalogue.

THE WHITE MOUNTAIN FREEZER COMPANY, Nashua, N. H., are intending to improve their Arctic Freezer for the coming season and have made new patterns throughout. They emphasize the point that no zinc surface is in contact with the cream in any Freezer manufactured by them. Their illustrated catalogue and price-list for 1891 will be issued in January, and will represent a few changes in list prices. The list price on the 1-quart White Mountain Freezer will be increased January 1 from \$2.50 to \$3, but there will be no other change in the list prices of any of their Hand Freezers. To enable them to allow the same discount on the Samson Power Freezer as they give on the White Mountain Hand Freezers they will establish list prices on it January 1, as follows: 25-quart, each, \$120; 40-quart, each, \$150. They can now furnish printers' copy of revised list prices to those who wish to publish the same in spring catalogue,

ANNOUNCEMENT IS MADE, under date December 1, that Brown, McClure & Co., dealers in Iron, Steel and Heavy Hardware, and Wm. Q. Wales, dealer in Tin Plates, Sheet Iron, Metals, &c., Boston, Mass., have formed a copartnership and united their different stocks under the firm name of Brown, McClure & Wales.

for the purpose of carrying on a general importing and domestic business in the following lines: Iron and Steel, Heavy Hardware, Blacksmiths', Carriage Makers' and Machinists' Supplies, Tin Plates, Sheet Iron, Metals, Roofers' Materials, &c. The business will be conducted at the new store recently built for them at 69-83 Purchase street, where they will carry a full assortment of the above goods.

**IN THEIR ADVERTISEMENT** in this issue it will be observed that Iowa Farming Tool Company, Fort Madison, Iowa, call special attention to the line of Fork Handles which they are putting on the market, either rough or chucked, bored and belted.

**THE PERFECTION SASH BALANCE**, manufactured by Perfection Sash Balance Company, Rochester, N. Y., is illustrated in the advertisement of the company in this issue. The fact that these goods are attached more easily than weights or other devices is alluded to, as well as the simplicity and effectiveness of the Balance.

**THE PROMINENT POSITION** occupied by Wire Nails and the enormous facilities for their production are illustrated in the fact that on Wednesday, 26th ult., 2241 kegs of Nails were turned out in the Wire Nail department of the Beaver Falls mills of Carnegie, Phipps & Co., Beaver Falls, Pa. This amount is 344 kegs in excess of the best previous record of the plant.

**JOHN P. LOVELL ARMS COMPANY**, Boston, Mass., advise us that they have calls from many of the leading houses in the trade to accept large orders from them for their Diamond Safety Bicycle, with a view to securing the goods in advance of the season. They have, however, so increased their facilities as to put them in a position for supplying a greatly increased number of these machines during the coming year, and express confidence that they will be able to take care of the trade. The machine was put on the market the past year, and the manufacturers advise us that the reception given it has been exceedingly gratifying.

**ANNOUNCEMENT** is made that the New Castle Wire Nail Company of New Castle, Pa., have purchased the entire interests of the New Castle Steel Company of that place. The last named concern made Bessemer steel rods exclusively, the greater part of the output being purchased by the New Castle Wire Nail Company. William Patterson, president of the New Castle Wire Nail Company, is also president of the New Castle Steel Company, and is also a large stockholder in both concerns. The purchase price is said to be \$350,000. It is also announced that the capital stock of the New Castle Wire Nail Company has been increased to \$500,000.

### When.\*

This is the title of a book with some of the contents of which our readers are in a measure familiar, as we have printed extracts from it in these columns. It is an interesting compendium "of business hints for business men, in business hours," and in the wisdom and sagacity of its maxims well fulfills its purpose. Its author, D. T. Mallett, of New Haven, Conn., is a successful Hardwareman and a clear and vigorous writer, and in this little volume the results of much observation, reading and experience are condensed into brief pointed paragraphs, each of which is the expression of a maxim which is well worthy the care-

ful consideration of business men in any line of trade. But the purpose of the volume and its spirit are well indicated in the preface:

The author of this little book wishes to acknowledge that many of the hints therein contained are the results of a "boiling down" process of long, though interesting, dissertations on special subjects, which were found scattered throughout a number of large and expensive volumes on business methods.

It is hoped that the condensing will not have destroyed the germs of truth contained in those bulky volumes.

Most of the "whens," however, are the result of personal observation and experience, and, while they may be open to the criticism of being perhaps simple and familiar to all, still it is a fact that some of the every day factors of success used by business men of tact are either unknown or not fully appreciated by tradesmen in general.

The time when, the place where and the method how are three of the foundation stones to every commercial edifice.

The object of the book is not to deal with details in the management of business, but rather to call attention to the general principles which underlie a successful business career, and many of the maxims—opening the book almost at random—are clear and forcible paragraphs which well deserve consideration on the part of those who are desirous of making the best success in business:

When a business is said to run itself it is generally the result of the force of gravitation. Gravity is always downward.

When undesirable goods accumulate the wheels of business are clogged.

When a dealer knows, fancies and buys what the public prefer and purchase, he can justly be said to be abreast of the times.

When goods are well bought, 'tis said they are half sold, but don't forget to complete the other half.

When business is particularly prosperous, develop personal caution.

Many of the maxims are colored by a quiet and quaint humor, which adds not a little to their interest and effectiveness:

When you are told that "a rolling stone gathers no moss," also remember that "a setting hen gathers no fat." Do not be entirely guided by old "saws."

When you come to regard employees as mere machines you should, if consistent, regard yourself as the crank.

When you attempt to run to success be careful not to stub your toe.

But a better idea of the scope and spirit of the book may be gathered from the following extracts from its closing pages:

When you are obliged to sell your goods for less than you paid for them, on account of a decline, the real loss occurred when the price dropped, not when you sold them.

When you make a verbal statement in regard to your financial condition, adhere to the truth as closely as if it were written.

When your credit is questioned do not consider it demeaning to furnish reasonable and proper evidence of your financial standing.

When you are obliged to obtain credit, remember that the "borrower shall be servant to the lender."

When you allow others to attend to your business, don't be surprised if the results are not exactly as you expected.

When you allow prejudice to determine your actions you are not true to yourself.

When you would establish credit, first establish a confidence in your honesty and ability with your creditor.

When you are told "do not put off until to-morrow what can be done to-day," remember that many things which were done yesterday are regretted to-day.

When you decide to place your business on a cash basis, lower your prices, as in the absence of an inducement of this kind your customers will prefer to trade with houses giving credit.

When you sell a portion of your goods on installments, base your terms on a legal interest advance over your regular cash prices. This method is just and popular.

When you are allowed a special low price by a manufacturer or jobber on a certain article, do not enlighten his competitor indirectly of the fact, as it is a dishonorable breach of commercial confidence.

When you are able to conduct your business sales on a cash basis you are protected from failure through the incapacity or misfortunes of others.

When you remember that it is always the unexpected which mars our well-laid plans, you will be prepared for defeat, while expecting success.

When you have discovered an arrangement which will bring your goods in sight and where they can be freely handled, you have commenced their sale.

When a man cannot see his way, "feeling" is a good substitute.

When you first visit a great metropolis to purchase goods, sleep over it one night before selecting.

When you feel the need of money you will increase your exertions; therefore run your business close.

When you consider credit, regard it as the result of the growth of commercial confidence, not as a mushroom plant.

When you think of business, view it as means of existence for the body, enabling you thereby to better equip the tenement of the soul. The purpose of your life is above mere commercial achievements.

The fact that the book is in attractive and convenient form, clearly printed on paper of superior quality, will also commend it to our readers, many of whom will doubtless find it a useful and suggestive manual of business hints. While it will repay perusal on the part of older merchants it will also be of special value to younger men who are desirous of applying to business the best results of experience.

### Notes on Pocket Cutlery.

In reply to the point which is sometimes made that the workmen in the employ of the American manufacturers of Pocket Cutlery have not the requisite skill to make the finest grade of goods, the Empire Knife Company, West Winsted, Conn., advise us that the workmen in their factory are all Sheffield men, many of them having been with Geo. Wostenholm & Son of Sheffield, and that nothing but S. & C. Wardlow's Sheffield steel is used in their factory. They further remark that they have their goods finely tempered by a man who was with Wostenholm for over 12 years. They give as a reason why American manufacturers have not made fancy Knives, including Scissor, Knives and combination Knives, that the cheap labor abroad has brought the Knives into this country cheaper than they could be made here. They believe that the Tariff bill will now stimulate the manufacture of this class of goods in America. It will be seen, therefore, that American manufact-

\* New York: Published by David Williams, 66 and 68 Duane street. Price 25c.

urers have facilities for turning out the higher priced goods which have formerly been made abroad.

The Southington Cutlery Company, Southington, Conn., advise us that they manufacture a full assortment of regular goods, fine Knives and Jack Knives. They in common with other manufacturers hope that the effect of the new tariff will be to enable them to get a fair remuneration for the capital invested in this work, while for the past few years the price has been on a steady decline until many manufacturers have been forced out of the business.

The Canastota Knife Company, Canastota, N. Y., are making a complete line of such Pocket Knives as are in common use, although they state the foreign competition has kept the production of many patterns down to a limited quantity, and even in these limited quantities there have in many instances sold below cost.

The Humason & Beckley Mfg. Company, New Britain, Conn., make and carry in stock about 500 different varieties or numbers of Pocket Knives. They advise us their line has been very largely increased the past few years.

There does not appear to be a disposition on the part of American manufacturers to largely advance prices on Cutlery, as a result of the increased tariff on this class of goods. On the other hand, they seem to view the situation as favorable for increasing their output, which means the employment of more labor, also adding to the line and style of their goods. We are advised by one Cutlery company that they do not expect to advance the price of Pocket Cutlery unless material advances. They now employ 35 workmen, but expect soon to have 200 names on their pay roll. Another prominent company write that they do not advocate monopolistic prices, but think the situation justifies a readjustment of selling prices to conform more closely to cost of production than they have done in the past. From advices at hand it would appear that the present situation is favorable to a larger and more varied line of American Cutlery at a moderate advance in price.

## Price Currents and Catalogues.

BY A. F. G.

THE CUSTOM has become so general, the issuing of price currents and illustrated catalogues of season goods by jobbing houses, that the number and extent of these publications are in a measure taken as indicative of the enterprise and energy of the house. The retailer expects to receive such publications, and depends largely upon their illustrations as a medium of selecting his goods. The traveling man also uses them and knows their value in obtaining orders, especially for future delivery. Although always alive to his own and his customers' interests, sometimes he will forget articles in the list he is enumerating, which he is anxious to sell, and which the customer should buy while ordering goods in that line. In this way the season catalogue is brought out, often forming a pleasant way of introduction to the subject of buying, especially if the day be stormy or trade dull. With their feet on the stove railing and cigars furnished by the traveler, the merchant supplied with a somewhat worn copy of the price current from the equally worn grip, the merchant's mind lulled into a comfortable condition by the re-

pose of the body and the well selected gossip about the adjoining towns, or a story suited to the occasion, he lazily turns over the leaves of the fall catalogue, asking a price now and then, and now and then inquiring about shape, size or appearance of certain goods. Almost before the customer is aware of the fact the salesman, owing largely to his price current, has an order down on his book, to which subsequently, it may be with some modifications, he secures the endorsement of the merchant. Perhaps there is no class of business men that have so largely utilized illustration as an effective means of stimulating trade as Hardware merchants and manufacturers, thereby showing a thorough appreciation of the fact that pictures are the most effective way of getting goods before the purchaser. The Hardware buyer has been so thoroughly educated in forming his ideas of the appearance of goods from illustrations of them that when the merits of a new article are being enlarged upon his first request is usually "let me see a picture of it." In fact, we know of no other plan in which the Hardware business could be successfully carried on under the present arrangement of selling goods, through traveling men, than by illustrated catalogues, as it is impracticable to carry heavy samples to any great extent. The frequency with which novelties are introduced makes it desirable for the traveling man to carry a new thing one or two trips, to familiarize his customers with it. When merchants used to visit the markets semi-annually to purchase goods they had an opportunity of seeing in the sample room what is now illustrated in catalogues. It is surprising to see how inadequate an idea of the appearance of an article is frequently received by a retailer's customer when ordering goods from a cut. When the article ordered arrives, it presents so entirely a difference in appearance, in size, finish and adaptability to the ends for which it is required, that in many cases the merchant keeps it rather than force its acceptance against the inclination of the purchaser. In the American cuts, as used for illustrating price currents and catalogues, a neatness and finish is noticeable, as not found in the same class of work elsewhere. The entire appearance of such publications is seldom other than a matter for congratulation. On a right use of catalogues and price currents it is obvious that the Hardwareman's success in good measure depends.

## Price Lists, Circulars, &c.

THE WINCHESTER REPEATING ARMS COMPANY, New Haven, Conn., New York and San Francisco: Repeating Fire Arms, Metallic Ammunition, Paper and Brass Shot Shells, Primers, Gun Wads, Reloading Tools, &c. Their line of Arms includes Single Shot Rifles, Rifled Muskets, Carbines, Hunting and Target Rifles, Repeating Shot Guns, Hotchkiss Magazine Fire Arms for military and sporting use. The new Winchester 22-Caliber Repeating Rifle, model 1890, is illustrated.

MANNING, BOWMAN & CO., Meriden, Conn., and 57 Beekman street, New York:

Special Temporary List of leading staple articles in Porcelain Enameled Ware for the fall and holiday season of 1890. This catalogue presents an attractive appearance, showing the decorations on Pearl Agate Ware in Colors. The lists are placed by the side of the illustrations, making them convenient for reference.

E. S. LEE & CO., Rochester, N. Y.: Pruning Tools, Eagle Pruning Shears, Lee's Telegraph Tree Pruner, Waters' Improved Tree Pruner, and Cast Steel Pruning Shears.

THE PETERS CARTRIDGE COMPANY, Cincinnati, O.: Prize Paper Shells and Cartridges, Peters' Indented Cartridges, Peters' Blank Cartridges, Special Loads, &c.

O. W. BULLOCK & CO., Springfield, Mass.: Fine Watch Tools, large variety, with prices both by the dozen and for single articles.

THE MISSOURI MALLEABLE IRON COMPANY, St. Louis, Mo.: Refined Malleable and Gray Castings, Clevises, Hay Fork Pulleys, Lap Links, Lemon Squeezers, Cube Pipe Tongs, &c. They also make special castings to order, which is a large feature of their business.

THE HENRY SEARS COMPANY, Chicago: Pocket Cutlery, Queen Razors, Queen Shears and Scissors, Butcher and Bread Knives, Carvers, Razor Straps and Flat Ware. All Cutlery, Razors, Scissors, Shears and Razor Straps are branded Henry Sears & Son, 1865, in this circular. Illustrations and net prices are given. Bargain sheet No. 50 relates to Pocket Cutlery, Scissors, Bread and Table Knives, Magnetic Razors, Carvers, Plated Child's Sets, Malleable Cover Lifters, Button Hole Scissors, with net prices, which are referred to as being 25 to 50 per cent. below regular.

FRANK B. MALLORY, Flemington, N. J.: Lightning Loader Hand Truck, Standard Shutter Worker, Carriage and Railway Lifting Jacks and Improved Hand Power Shell Mill. A *fac-simile* certificate is given, stating that Mallory's Improved Hand Power Shell Mill will grind oyster shells at the rate of one peck in nine minutes.

THE JEWELL BELT HOOK COMPANY, Hartford, Conn.: Potter's Patent Improved Belt Hooks for Leather, Rubber and Cotton Belts, and Jones' Patent Bevel Pointed Belt Hook. To meet the demand for extra heavy hook for heavy driving Belts, they make a Special A and Special B Potter Hook.

PREWITT, SPURR & CO., Nashville, Tenn.: Red Cedar Pails, Cans, Churns, Oak Well Buckets, Candy Pails, Oyster Pails, &c.

WHITMAN AGRICULTURAL WORKS, Auburn, Maine: Horse Powers, Threshing Machines, Agricultural Implements and Farm Machinery.

BRADLEY & HUBBARD MFG. COMPANY, Meriden, Conn.: Gas and Electric Light Fixtures, Andirons, Fenders, Fire Sets, Art Metal Goods, Onyx Top Tables and Pedestals, Easels, Pitchers, Vases, B. & H. Piano, Banquet, Table and Hanging Lamps.

LANDERS, FRARY & CLARK, New Britain, Conn.: Knives and Forks, Children's Knives, Butter, Orange, Lemon, Lime and Fruit Knives, Nut Picks, Beef, Game, Fish, Beefsteak and Bird Carvers, Cheese Scoops, Berry Spoons, and Cutlery, in cases, for wedding and holiday gifts.

CHICAGO HOSE REEL COMPANY, Chicago: Kimball's Patent Swinging Hose Basket, made of wrought iron and steel, bronzed in gold or nickel plated, or brass finished to order.

THE ASBESTOS PACKING COMPANY, represented by E. S. Greeley & Co., 5 Dey street, New York: Asbestos Rope Packing, Wick Packing, Mill Board, Flooring Felt, Roofing, Cement Felting, Hair Felt, Removable Covering, Stove Lining, &c., all made from Asbestos and referred to as strictly fire and acid proof.

**JOHN McDERMAID**, Rockford, Ill.: Boss and Star Churns, Dog Powers and Dairy Supplies.

**DAVID N. BROWN MACHINERY COMPANY**, St. Louis, Mo.: Stationary and Portable Engines, Boilers, Steam Pumps, Saw Mills, Saw Tools, Planers, Feed Mills, Cane Mill Machinery, Corn Shellers, &c.

**MUNCIE ARCHITECTURAL IRON WORKS**, Muncie, Ind.: Architectural and Ornamental Iron Work for buildings, Iron Fence, Gates, Posts, Railing, Cresting, &c.

**C. & W. McCLEAN**, St. Louis, Mo.: Guns, Ammunitions, Gun Tools, Sporting Goods, Water Proof Clothing, Targets, &c.

**WESTERN FILE COMPANY**, Beaver Falls, Pa.: Cast Steel Files and Rasps, with list prices in convenient form.

**LEHIGH VALLEY BRASS WORKS**, Bethlehem, Pa.: Brass Cocks, Valves, Oil Cups, Whistles, Ross' Improved Patent Valves, Gauge Cocks, Oil Cups, Car Brasses, Brass Machinery, Castings, Babbitt and Anti-Friction Metals.

**STANDARD HANDLE COMPANY**, Knoxville, Tenn.: Turned and Hand Shaved Hickory Axe Handles, Turned Hickory Pick Handles, Sledge, Tool and Maul Handles, Short Handles, &c.

**E. T. BARNUM**, Detroit, Mich.: Bostwick Folding Gates, Wire Flower Pot Stands, Guards for Doors and Windows.

**THE THOMAS MFG. COMPANY**, Springfield, Ohio: Lawn Mowers, Rakes, Tedders, Iron Pumps, &c. The Thomas Lawn Mower is made with two or three knives, and is illustrated in a variety of circulars.

**D. B. HENDRICKS**, Kingston, N. Y.: Lever Portable Baling Press, for baling hay, straw, cotton, wool, husks, rags, paper, manure, &c.

**GENEVA TOOL COMPANY**, Geneva, Ohio: Hay, Straw, Manure and Spading Forks, Garden, Mortar, Planters', Cotton and Weeding Hoes, Cast Steel and Malleable Garden Rakes, Potato and Manure Hooks, Ferrules and Overcaps, Scythe Snathes, Handles, Hand Hay Rakes, Cultivators, Wing Shovel Plows and Revolving Horse Hay Rakes.

**THE CHALLENGE CORN PLANTER COMPANY**, Grand Haven, Mich.: Sixth annual illustrated catalogue and price-list for 1891. Their New York office is 106 Chambers street, B. B. Neal, salesman. The catalogue relates almost exclusively to Refrigerators, is printed on a fine quality of paper and is certainly an exceptionally handsome publication. It represents a very interesting and attractive line of goods, with some recent additions, which are deserving the attention of the trade. The Challenge Iceberg Hardware Refrigerators are shown in a variety of styles, including Ice Chests and Sideboards. Attention is directed to the trimmings used on their goods, illustrations being given of their Casters, Locks, Hinges and Escutcheons. Among other improvements they state that in their new designs they dispense with all miter joints on the lid, also on the covers of the base or feet.

**THE OTSEGO FORK MILLS COMPANY**, Girard, Pa.: Hay and Manure Forks, Barley Forks, Coke, Coal, Sluice and Farmers' Forks, Spading Forks, Field, Ladius and Mortar Hoes, Weeding Hoes and Rakes, Garden Rakes, Potato and Manure Hooks, Corn Hooks, &c., also Handles, Ferrules and Malleable D's.

**THE FARMERS' FRIEND MFG. COMPANY**, Dayton, Ohio: Plating, Seeding and Tilling Machines, Cultivators, Planters, Check Rowers, Drills, Hay Rakes and Loaders, Lawn Mowers, Harrows, Hay Presses, &c.

**EUGENE MUNSELL & CO.**, 218 Water street, New York: Price-list of selected Mica, sizes from  $1\frac{1}{2} \times 2$  to  $8 \times 10$  inches, also net prices of 1, 2 and 3 pound packages, containing assorted sizes of either North Carolina or Wyoming Mica. For

the convenience of retailers, they include in this price-list prices at which the different sizes of Mica may be sold to retail customers by the sheet.

**WEEKS & REY**, Buffalo, N. Y.: Union Platform Scales, Portable Platform Scales, Warehouse, Depot, Car, Miners' and Grain Hopper Scales. Particular attention is directed to Weeks' Patent Combination Beam U. S. Standard Scales, with iron levers, steel bearings and brass nickel plated beams, for which the claim is made that no weights can be lost or stolen.

**THE CENTRAL EXPANDED METAL COMPANY**, Pittsburgh, Pa.: Expanded Metal, as used for Fences and Lathing. A suggestion is made that a stone house can be closely imitated by using cement on Expanded Metal Lath, at about one-third of the cost of solid stone.

**L. C. BEARDSLEY & CO.**, Cleveland, Ohio: Domestic Oil Cans, Pitch Top Wood Jacket Oil Cans, Economic Self Basting Steam Roaster, Buckeye Measures, Steel Stove Shovels, &c. A recent addition to their line is their Reliable Oil or Gasoline Can, 5 gallon capacity, made of Juniata galvanized iron, with brass nickel plated faucet. It is stated these Cans are handsomely japanned and ornamented in red, blue or olive green.

**THE HUMPHREYS MFG. COMPANY**, Mansfield, Ohio: Iron and Brass Pumps for hand and power, Brass Goods and Supplies for plumbers, steam and gas fitters, engine builders and water works, Sanitary Specialties, Radiators, Natural Gas Supplies, &c. Their 1890-91 catalogue, containing 445 pages, is cloth bound, profusely illustrated, giving lists, and in addition to an index of goods in the front, has an index to figures or illustrations in the back of the book. These and other features in the arrangement and completeness of the work indicate great care and appreciation of the needs of the trade, and a marked development in their business, as compared with their former catalogue.

**H. W. LUETKEMEYER & SONS**, Cleveland, Ohio: Reid's Little Wonder Tack Pull, Dandy Trap, Burden's Easy Horse Shoe.

**MARSEILLES MFG. COMPANY**, Marseilles, Ill.: Wind Mills, Corn Cultivators, One Row Corn Stalk Cutter, Feed Grinders, Bob Sleds, Tower and Band Corn Shellers, &c. Attention is directed to their Cyclone Force Feed Power Corn Shellers, made in mounted belt, mounted gear, down belt, down gear, &c.

**ST. LOUIS STAMPING COMPANY**, St. Louis, Mo.: Granite Ironware, Dripping Pans, Galvanized Sheet Iron, Hotel Ware, Deep Stamped Ware, Stamped Trimmings, Tinner's Miscellaneous Supplies, Japanned Ware, Toys, Pieced Tinware, Hammered and Polished Ware, Coal Hods, Galvanized Ware, Black and Polished Ironware, Miscellaneous Goods, Tinner's Tools and Machines. Their November, 1890, catalogue is illustrated with list prices, the goods being classified in the order given above. The book is  $5 \times 7$  inches in size, with flexible cloth covers, and contains 316 pages.

**THE C. M. SHIRK MFG. COMPANY**, 112 and 114 Lake street, Chicago: North Star Refrigerators for the season of 1891. The work comprises 28 pages of illustrations, with views showing construction, with illustrations of Shelves, Legs, Traps, &c. Eighteen styles of Refrigerators are shown, embracing Chests, Single Door and Double Door Plain Refrigerators, Sideboards, Grocers' Refrigerators, &c. All are made of hardwood, handsomely finished. The Sideboard Refrigerators are specimens of fine work in carving and other embellishment.

**GEORGE M. BALLARD**, Newark, N. J.: Trunk Rollers, Trunk Bolts, Malleable Corner Clamps, Malleable and Wrought Handle Loops, Trunk Bottoms, Top Lifters, Ballard Patent Trunk Catches, Handle Caps and Japanned Corner Irons. Attention is directed to Michelson Patent Revolving Roller Caster; also to the Arnold

Trunk Catch which is being manufactured in connection with Ballard's Patent Wrought Rivet.

**GALEN, ORR & CO.**, Needham, Mass.: Orr's Patent Wrought Blind Hinge Hook, Novelty Steel Wire Blind Fast, and C. B. White's new Window Blind Fastener. These Fasteners are referred to as holding blinds open or shut, or at any angle.

**THE BURTON HANDLE CO.**, Burton, Ohio: Crosby patent Bob Sleds and Knuckles, Empire Cultivator, Revolving Horse Rakes and Hand Rakes. Particular attention is called to special features of the Crosby Bob Sleds.

**J. W. MIXTER SAW TOOL COMPANY**, Plymouth, Mass.: Mixter's Patent Saw Gummers, Saw Tooth Swages, Side Files, XX Cutters, Mill Stone Picks, Patent Belt Awls, Patent Speed Indicators, Saw Rounding Machines, &c. Particular attention is directed to the Mixter Patent Saw Gummers and Swages.

**THE NATIONAL CASH REGISTER COMPANY**, Dayton, Ohio: National Cash Registers; also pamphlets, "Five Years' Experience of a Retailer," giving experience with National Cash Registers, and "How can I Double my Business Capacity?" Explaining the National Cash Register color system.

**PARRY MFG. COMPANY**, Indianapolis, Ind.: Parry Wagon, Villa or Phæton Cart, Ball Bearing Road Cart, Governor Road Cart, and Hoosier Road Cart.

**RIEHL BROS.**, Philadelphia, Pa.: Scales, Testing Machines, Trucks, Letter Presses, Barrows, Scrapers, Oil Tanks, &c.

**THE MARTIN PROCESS FIRE PROOFING PAINT COMPANY**, 162-164 West Twenty-seventh street, New York: Fire Proofing Oil Paints in all colors, Fire Proofing Kalsonines and Liquids for rendering Woods and Textile Fabrics of all kinds uninflammable.

**MILWAUKEE HAY TOOL COMPANY**, Milwaukee, Wis.: Forks, Hay Carriers, Pulleys, Hanging Hooks, Rafter Brackets, Steel Rafter Grapple, Rope Hitch, Slings and Corn Husker and Fodder Cutter. The latter is referred to as requiring 2 and 4 horse-power to run it, with a husking capacity of 30 bushels per hour.

## Exports.

PER BARK CONCORDIA, NOVEMBER 10, 1890, FOR BRISBANE, QUEENSLAND.

By Edward Miller & Co.—28 packages Lamp Goods.

By The Goulds Mfg. Company.—33 Pumps.

By Healy & Earl.—12 dozen Wheelbarrows.

By F. & J. Meyer.—260 dozen Axe Handles.

By Meriden Britannia Company.—11 Boxes Plated Ware.

By V. Basanta.—18 dozen Hoes, 14 dozen Wrenches, 1 dozen sets Sad Irons,  $2\frac{1}{2}$  dozen Choppers, 27 Granite Ware, 22 dozen Locks, 13 Cutters, 15 Pullers, 31 Coffee Mills, 4 gross Coat and Hat Hooks, 65 dozen Lamp Goods.

By Arkell & Douglas.—99,703 pounds Barb Wire, 250 dozen Axes, 25 Scales, 12 dozen Wrenches, 560 pounds Oil Stones, 40 dozen Axes, 30 sets Axles,  $\frac{1}{4}$  dozen Harrows, 6 Axes, 16 dozen Hatchets, 38 Stoves,  $\frac{1}{2}$  dozen Oil Stoves, 8 dozen Axes, 1 case Leather Belting, 6 Churns, 25 dozen Axes, 4 dozen Hatchets, 6 Lawn Mowers, 1 dozen Sausage Stuffers, 67,000 Cartridges, 1 dozen Corn Shellers, 3 dozen Traps, 1 dozen Hay Knives,  $2\frac{1}{2}$  dozen drills, 1 dozen Wringers,  $1\frac{1}{4}$  dozen Meat Choppers, 12 dozen Cages, 95 dozen Cow Bells.

PER BARK FLORA, NOVEMBER 10, 1890, FOR ADELAIDE, AUSTRALIA.

By Sargent & Co.—13 packages Hardware.

By Fairbanks & Co.—22 cases Scales.

By Meriden Britannia Company.—8 packages Plated Ware.

By Weaver & Sterry.—150 pounds Nails.

By Russell & Erwin Mfg. Company.—18 packages Hardware.

By Edward Miller & Co.—88 packages Lamp Goods.

By Arkell & Douglas.—488 bundles Barb Wire, 5 dozen Bench Screws, 5 dozen Bars, 5 dozen Mangles, 28 dozen Wringers, 39 dozen Faucets, 24 dozen Hay Knives, 5

Sinks, 30 dozen Axes, 11 Chucks, 232 dozen Shovels, 87 Stoves, 52 dozen Axes, 11 dozen Pumps, 23 dozen Glue, 7 dozen Oil Stoves, 73 dozen Lampware, 9 dozen Axes, 12 dozen Mangles, 8% dozen Saws, 1 dozen Plated Ware, 4 dozen Cradles, 1 dozen Mangles, 16 dozen Granite Ware, 24 dozen Traps, 206 pounds Files, 858 pounds Rivets, 30 dozen Snaths, 28,000 Cartridges, 36½ dozen Wrenches, 40 sets Axes, 13 dozen Hoes, 30 dozen Forks, 12 Stoves, 4 Stoves, 32½ dozen Meat Choppers, 204 pounds Carriage Hardware, 620 pounds Iron Clamps, 960 pounds Forges, 2 cases Forks, 2 cases Wringers, 1 case Apple Parers, 7 cases House Hardware, 4 cases Rubber Goods.

PER BARK SOPHIE HELENE, NOVEMBER 14, 1890, FOR BRISBANE, QUEENSLAND.

By Winchester Repeating Arms Company.—100,000 Primers.

By Meriden Britannia Company.—9 boxes Plated Ware.

By R. W. Forbes & Son.—32 crates Stoves, 8 dozen Saws, 3 cases Lamp Ware, 1 dozen Emery Wheels, 3 gross Hardware, 1 dozen Wheelbarrows, 35 dozen Tools, 25 dozen Saws, 2 packages Forks, 3800 Bolts, 8 packages Hardware.

By H. W. Peabody & Co.—1 case Corn Mills, 10 cases Edge Tools, 5 cases Nails, 31 cases Hardware, 4 packages Lamp Ware, 1 case Air Guns, 1½ dozen Hoes, 6 dozen Rakes, 1 case Forks, 18 cases Edge Tools, 6 dozen Broilers, 2 cases Hardware, 36 packages Lawn Mowers, 17 cases Hardware, 22 coils Hose, 1 cask Lamp Ware.

PER BARK LETO, NOVEMBER 13, 1890, FOR BRISBANE, QUEENSLAND.

By R. W. Forbes & Son.—20 packages Carriage Hardware, 5 packages Pumps, 36 packages Hardware, 1 dozen Snaths, 13 dozen Axes, 25 crates Stoves, 2 dozen Bench Screws, 17 packages Hardware, 19 packages Stoves, 6 packages Hardware, 13 cases Stoves, 1½ dozen Churns, 2 dozen Hammer Handles, 17 packages Hardware, 10 dozen Snaths, 10 dozen Spade Handles, 6 dozen Hay Forks, 300 dozen Axe Handles, 96 dozen Sledge Handles, 24 dozen Hammer Handles, 30 dozen Pick Handles, 70 dozen Axes, 45 Stoves, 2 dozen Churns, 42 Stoves, 11 packages Plows and parts.

#### FOR HOBART.

By A. S. Lascelles & Co.—1960 pounds Nails. By W. H. Crossman & Bro.—1 dozen Cork Pullers, 46 cases Tools, 3 dozen Wire Mats, 1 gross Traps, 3 dozen Hatchets, 6 dozen Pruning Shears, 1 gross Traps, 33 cases Hardware.

By Arkell & Douglas.—½ dozen Sinks, 3 dozen Axes, 26 dozen Blocks, 12 dozen Rakes, 224 pounds Oil Stoves, 5 dozen Axes.

By R. W. Forbes & Son.—19 packages Harrows, 5 packages Hardware, 25 dozen Axes, 2½ dozen Wringers, 2 dozen Carpet Sweepers, 1 dozen Meat Choppers, 50 kegs Nails, 30 dozen Axes, 1 case Hardware, 71 dozen Axes, 1 case Hardware.

PER BARK ALBATROSS, NOVEMBER 14, 1890, FOR FREEMANTLE, AUSTRALIA.

By H. W. Peabody & Co.—20,000 Cartridges, 15 packages Lampware, 2 cases Sinks, 1 case Saddlery, 54 packages Hardware, 2 packages Pumps, 34 pounds Nails, 1 case Razors, 2 cases Wringers, 10 packages Windmills, &c., 3 crates Harrows, 14,000 Cartridges, 36,000 Primers, 1 case Bolts, 4 Scales, 36 sets Axes, 4 cases Lawn Mowers, 24 Seed Sowers, 1 case Faucets, 4 Lawn Mowers, 8 cases Edge Tools, 2000 Cartridges, 4000 Primers, 4 dozen Sluice Forks, 2 cases Edge Tools, 4 cases Rat Traps, 9 cases Hardware, 18 Guns, 10,000 Cartridges, 2 cases Tinware, 6 cases Edge Tools, 60 reels Barb Wire, 1 case Guns, 5 packages Hardware, 1 Lawn Mower, 1 case Wireware, 3 crates Stones, 300 feet Rubber Hose, 2 cases Plated Ware, 5 packages Churns, 1 case Hardware, 1 case Stones, 3 crates Churns, 9 Steel Scrapers.

By R. W. Forbes & Son.—30,000 Cartridges, 4 dozen Picks, 3 Scythes.

By F. B. Wheeler Company.—2 Pumps.

By Arkell & Douglas.—8 dozen Traps, 3 dozen Hammers.

By Itsley, Doubleday & Co.—3 cases Hardware.

By W. H. Crossman & Bro.—1 gross Egg Beaters, 3 dozen Hoes, 1 dozen Wringers, 8 dozen Pick Axes, 6 Stoves, 10,000 Cartridges, 7 dozen Braces, 12 dozen Forks, 3 dozen Traps, 1 dozen Mangles, 4 dozen Grindstone Fixtures, 2 cases Plated Ware, 2 cases Pump Parts, 1 gross Wrenches, 66 sets Axes, 8 packages Lamp Goods, 20 cases Hardware.

PER BARK FLORENCE B. EDGETT, NOVEMBER 14, 1890, FOR EAST LONDON, SOUTH AFRICA.

By Corner Bros. & Co.—20 Plows.

By Arkell & Douglas.—18 Hay Cutters, 96 cases Plows, 34 Corn Shellers, 80 dozen Axes,

200,000 pounds Barb Wire, 923 cases Agricultural Implements, 104 Plows, 4 dozen Hammers, 460 dozen Axes and Hatchets, 20 Washing Machines, 754 pounds Rope, 500 pounds Horse Nails, 9 Rod Scrapers, 40 Scales, 10 Pumps, 20 Ladders, 6 Saws, 12 Ladders, 85 Stoves, 7900 pounds Nails, 22 dozen Rakes, 263 Churns, 20 dozen Axes, 3 Scales, 15 dozen Wrenches, 6 dozen Axes, 6 dozen Wringers, 2½ dozen Churns, 2 Grindstones, 36% dozen Saws, 5½ dozen Blocks, 1 case Garden Tools, 500 feet Hose, 189 dozen Hardware, 4 dozen Firearms, 18 dozen Axes, 6 Scales, 7 cases Agricultural Implements, 64 dozen Hardware, 400 pounds Nails, 82 dozen Hardware, 2 Scales, 6 Washing Machines, 130 dozen Hardware, 900 pounds Nails, 12 dozen Traps, 30 dozen Axes, 10 Scales.

PER BARK P. J. PALMER, NOVEMBER 14, 1890, FOR PORT NATAL, SOUTH AFRICA.

By Woodhouse & Stortz.—400 pounds Edge Tools, 10 pounds Hardware.

By H. W. Peabody & Co.—38 cases Plows, 25 packages Corn Shellers, 300 pounds Nails, 2 Corn Shellers, 6 Wooden Faucets, 5 cases Hardware, 6 dozen Mouse Traps, 15 cases Picks.

By Coombs, Crosby & Eddy.—50 cases Edge Tools, 560 pounds Nails, 4 dozen Pumps, 4½ dozen Tools, 10 cases Agricultural Implements, 1050 pounds Nails, 2 dozen Meat Choppers, ½ dozen Scales, 2 dozen Cow Bells.

By W. H. Crossman & Bro.—21 dozen Lamps, 1½ dozen Pumps, 19 packages Hardware, 12 dozen Wheelbarrows, 10 dozen Lamps, 1 case Flint Paper, 5000 pounds Wire, 1 dozen Ladders, 3 cases Plated Ware, 5 Washing Machines, 193 cases Agricultural Implements.

## REVIEW OF THE WHOLESALE MARKET IN PAINTS AND OILS.

*It should be understood that the prices quoted in this column are strictly those current in the wholesale market, and that higher prices are paid for retail lots. The quality of goods frequently necessitates a considerable range of prices.*

#### Paints and Colors.

Conditions that operated to hold business in check last week have continued during the period under review, and quiet markets all along the line have therefore to go on record again. The Pig Lead and Linseed Oil situation is now so clearly defined that scarcely a doubt is entertained that prices for White Lead must be reduced in a few weeks, and lower prices for that commodity are likely to have an effect upon values of cheap competing compounds. Cheaper Oil not only has a bearing upon the same goods, but reduces the cost of ready-mixed Paints and Colors in Oil, so that some revision in prices in those lines is not improbable. Meanwhile business is rather slow outside of specialties in the line of artists' materials particularly adapted to the holiday trade.

*White Lead.*—The situation is wholly unchanged, as far as corroders are concerned. They maintain the old list prices for the present, but leave it to be understood that revised quotations will be out, probably to go into effect about January 1. Jobbers, as a matter of course, are disposing of what supply they have on hand at prices very close to actual cost. No changes are openly quoted on inferior Leads, but some brands, more particularly Lead and Zinc mixtures, are said to be selling at some little concession from late card prices, and the market for that and the cheaper varieties is slightly irregular.

*Red Lead and Litharge.*—The transactions in this line have been on a very moderate scale and confined to such quantities as might be required to tide over immediate wants. Buyers are more than ordinarily cautious, because of the belief that corroders' prices will soon be reduced.

*Zincs.*—For American Oxide there has been merely the routine season demand, with the inquiry chiefly to rather smaller parcels. The market derives support from the extent to which production is

sold ahead, and prices are held firmly. Foreign brands are also slow of sales, but quite firmly held at the prices that have ruled for some time past.

*Colors.*—In the staple lines of Dry Colors adapted to house painters' use there has been little doing the past week, and grinders' Colors have been equally as quiet. Values hold quite steady, however, all through. Colors in Oil are without positive change, but the lower prices for Linseed Oil tend to cause some uncertainty as to values in the near future. Manufacturers of American Quicksilver Vermilion have reduced their prices 2½¢ to 9 lb, and now quote 75¢ for bulk, casks or 100-lb kegs; 76¢ in 30-lb or 50-lb bags.

*Miscellaneous.*—The situation of the Chalk market is practically the same as was outlined last week, and the same is to be remarked of Whiting, with the further statement that business at present is slow. Paris White and the general line of Clays remain unchanged.

#### Oils and Turpentine.

Changes in the Oil market have been few and unimportant. As far as movement of supplies is concerned, there is absolutely nothing out of the routine distribution to note, and from neither buyers, or sellers' standpoint of view does the present situation contrast a great deal with that of a week ago. Values, it need hardly be remarked, have remained almost stationary.

*Linseed.*—Still lower prices have been quoted by Western manufacturers with a view to working up a larger outlet for their product in Eastern markets. On carload lots they have named as low as 54¢, and smaller quantities were offered at 55¢. The results thus far do not appear to have been gratifying. At all events, sales thus far are said to have been unimportant.

*Cotton Seed Oils.*—The condition of the market has not improved. Exporters are buying in a very indifferent manner, the home trade demand shows no signs of expansion and supplies steadily accumulate. The receipts are still largely of low grade product, and that fact doubtless has more or less unfavorable bearing, causing as they do an unusual wide range of prices, besides considerable trouble to the buyers.

*Lard Oil.*—About the usual distribution has been experienced, but outside of this jobbing movement there is practically nothing doing. The situation of the market for raw material has not changed. Pressers therefore hold to previous prices for their product.

*Fish Oils.*—Several hundred barrels of prime quality crude Menhaden Oil have been sold at 23¢, but it is considered doubtful that further lots could be secured except at an advance, as the close of the fishing season finds supplies only fair in volume and in few hands. There has been no change on crude Sperm or crude Whale Oils. All the manufactured products are firm at the old prices, and sell firmly in a jobbing way.

*Miscellaneous.*—Cocoanut Oils on the spot are held at higher prices, owing to an accident to a ship that had a considerable quantity aboard. There are, however, offers of Ceylon stock for direct steamer shipment from England at 4¢ below the price asked for spot lots. Olive Oil is slow of sale and without change in value.

*Spirits of Turpentine.*—Prices have ruled lower in the Southern centers owing to accumulation of supplies there and the local market is weaker in sympathy. Sellers are offering at 39½¢ @ 40¢ here, with very indifferent results in the way of business. A stock of about 2000 barrels is still being carried over by local receivers.

## NEW PUBLICATIONS.

**ALLEN'S REFERENCE TELEGRAPH CODE.** For Public or Private, Inland or Cable Uses. Abridged edition. For Manufacturers' and Jobbers' Uses. By Luther P. Allen, Chicago. 12 mo., 71 pages, \$3.

This is designed to be a universal code by which people in all branches of trade can communicate with one another, using the same copy and system for all. They can thus in conformity with the rules adopted by the Telegraph Congress of all cable companies throughout the world, quote and order from price-lists, and state prices and figures at the expense of a single message of the limited number of words, and of letters to a word, allowed by the established code of the companies. The articles referred to can be changed without affecting the system, and by agreement it may mean something different on successive days. It is in short a system of Latin roots, with references, having endings of a specified number of letters (four) with references.

In code language a message might read:

*Asturodem, Cassidacuk, Bagradabil, Ablutadid, Bagradacar, Abruptajid, Barbul-acod, Absensefia.*

Translated the above message reads:

*Astur- (769) odem (22)  
Send by the cheapest route.  
Cassid- (1098) 10 acuk (10)  
Catalogue No. 10 10  
Bagrad- (853) abil  
Dozen (853) three (3), &c.*

Or in full:

Send by the cheapest route, catalogue No. 10, three dozen lot No. 1973, six dozen lot No. 3633, nine cases lot No. 4198.

The roots with numerical references from 100 to 750.00 in this abridged edition are used to indicate lot or stock numbers in even hundreds, while the endings, with numerical references from 1 to 99, are used with them to indicate lot or stock numbers in less than hundreds. There are 1500 general mercantile terms and commercial phrases indicated by 50 roots, from 750 to 800, having literal references. From 800 to 900 the roots with numerical references indicate commercial quantities. In the unabridged edition for universal use the same system is extended to greater numbers and a larger variety of commercial terms. This book is sold only by subscription.

**WORLD'S FAIRS.** By C. B. Norton.

An exceedingly interesting volume has been prepared by C. B. Norton, under the title "World's Fairs from London, 1851, to Chicago, 1893," and published for the World's Columbian Exposition of Chicago. While the fact is generally known that the first well defined World's Fair was the one held in London in 1851, there are probably but few persons who are able to name all which have since been held. Mr. Norton makes the following list: Dublin, 1853; New York, 1853; Paris, 1855; London, 1862; Paris, 1867; Vienna, 1873; Philadelphia, 1876; Paris, 1878; Sydney, 1879; Melbourne, 1880; foreign world's fair, Boston, 1883; Paris, 1889. Paris has made itself the great world's fair city, having held four great expositions, one in each decade since world's fairs were inaugurated. The leading features, statistics, &c., of all these expositions are presented by Mr. Norton, together with illustrations of the buildings erected. The information relative to the more recent expositions, from the Centennial in Philadelphia in 1876, is especially comprehensive, covering many points of interest on which information is not readily accessible. The volume appropriately closes with a full account of the preparations made for the Chicago World's Fair in 1893. Portraits of the most prominent exposition

officials are given, and lists of the members of the commission committees, &c. The importance of Chicago from financial, industrial and commercial standpoints is fully set forth by carefully prepared statistics. Illustrations are given of the leading buildings, hotels, &c., and the facilities possessed by the city for the entertainment of large crowds are shown to be equal to almost any contingency. The volume comprises 93 pages of letterpress, and is well worthy of preservation.

**THE CHEMISTRY OF IRON AND STEEL MAKING.** By W. Mattieu Williams. Chatto & Windus, Piccadilly, London.

W. Mattieu Williams is too widely known as a graceful writer to need commendation in that direction, but we suspect that he has not had a very close connection with practical work for some time, although earlier in his career he was chemist in the works of John Brown & Co. The introduction is largely taken by the charming vindication of the claims of Dud Dudley, the greater part of which we reproduced in *The Iron Age* last week. In speaking of the iron ore Mr. Williams' treatment is almost exclusively from the standpoint of the English ironmaster. He does not even name the great magnetite deposits of this country, nor does he touch upon the great Minette deposit of Luxembourg and France.

Our iron makers will differ sharply with him when he doubts that roasting of iron ores for the removal of sulphur does little good, and that the actual practical advantage of roasting iron ores is limited to the getting rid of water and carbonic acid and rendering the iron stone more porous. Such a view of an important matter is decidedly too insular. Modern iron metallurgists will stand aghast, too, at the following: "So far as I have learned, the difference between these conditions of pig iron (gray and white) is mainly due to the temperature at which it has been melted, and from which it has been rapidly cooled, the proportion of combined carbon increasing with the heat." "Thus in the Bessemer converter the first effect of the blast is to convert the gray iron of the charge into white iron, or the graphitic carbon." The achievements of the past 15 years in establishing the role of silicon do not seem to have penetrated Mr. Williams' study.

We are not much impressed either with his chapter on the chemistry of the Bessemer process. It absolutely ignores the effect of high initial heat in modifying the rate of elimination of the different elements. Mr. Williams seems to be ignorant of the classical work done by T. G. C. Mueller in this branch of metallurgy, nor has he paid any attention to the chemistry of the basic process, which his readers have every reason to expect to find fully treated. There is no record of the admirable work done in the chemistry of the crucible steel process in Germany, nor any reference whatever to open hearth steel manufacture. Still Mr. Williams is so original in many of the views he presents, and he roams so delightfully over the great field of iron and steel manufacture that his work will prove very interesting. It would be a very unsafe guide, to a beginner, however.

The American Filter Company of Chicago were awarded an important contract on the 22d ult. The stockholders of the Davenport (Iowa) Water Company voted to borrow \$300,000 for the construction of a filter plant, and, among four competing companies, chose the Chicago company's system, although their opponents were the oldest and best known manufacturers of mechanical filters in the country. The plant at Davenport, it is claimed, will be the largest mechanical filter in the world.

Its capacity will be 7,500,000 gallons a day and the guaranteed minimum output 6,000,000 gallons. The orders for machinery will probably be placed with Chicago firms. The water company expect to supply filtered water to the city of Davenport about April 1. The patentees of the American system of filtration are Messrs. Davis and Biddell, both of Chicago.

Canadian wrought iron manufacturers are reported to be excited over the capture of a number of orders by foreign makers. It is reported that the sales in question were made by Lomer & Rose, of Montreal, for German producers.

It is reported that four large canneries, located respectively in Bloomington, Gibson City and Hooperstown, Ill., have decided to build a plant for the manufacture of their own cans of a capacity equal to 50,000 tin cans a day.

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**The No. 20 Princess Clothes Wringer.**

The Lovell Mfg. Company, Erie, Pa., are introducing the No. 20 Princess Wringer, as illustrated herewith. The wringer is described as having patent vulcanized rolls, two pressure screws,

able castings, in three sizes, 36, 42 and 48-inch wheels, with a stated capacity of 100 to 300 feet of 2½ inch rubber fire hose, and a proportionately larger amount of smaller sizes. They are adapted for use in mills, factories, parks and small villages. These carts are referred to as passing through



*The No. 20 Princess Clothes Wringer.*

double rowell gears, and malleable iron swivel clamps. These clamps are intended to fit round or square tubs. It also has two drop aprons to carry the clothes over either side of the tub, being a double sided wringer, and will wring either way. This wringer is referred to as being the same as their No. 10 Princess wringer, except in the size of the rolls, which are 12 x 2 inches, and the arrangement of the clamps and apron, which are so constructed as to permit the clamps to swing to either side of the wringer, permitting it to be attached to either side of the divisions of stationary tubs, and to wring either way, also allowing its use upon either round or square portable tubs.

**Wirt's New Hose Cart.**

The Wirt & Wait Mfg. Company, Independence, Mo., are introducing a new



*Wirt's New Hose Cart.*

Hose Cart, as illustrated herewith. These carts are similar in construction to their Garden Hose Reels, but larger, intended for carrying fire hose. They are made exclusively of gas pipe and malle-

any ordinary doorway, as occupying a comparatively small space, and as light, strong, durable and easy to manipulate.

**Eureka Safety Christmas Tree Holder.**

H. W. Diek & Co., Baltimore, Md., are offering to the trade an iron Christmas Tree Holder, as illustrated in Fig. 1. The



*Fig. 1.—Eureka Safety Christmas Tree Holder.*

holder is 4½ inches in diameter and 7½ inches high. It is intended to be filled daily with water. Fig. 2 gives a view of the interior construction. The holder is provided with lugs at the base, for screw-



*Fig. 2.—Sectional View of Christmas Tree Holder.*

ing to the floor or other support. The tree is placed firmly in the center of the holder and the thumb screws tightened to hold it in place. It is stated that the tree supplied with water will keep green for months, the needles not dropping off, thus greatly diminishing the danger of the tree taking fire.

**An Interesting Sign.**

A correspondent writes : The workers in brass cannot fail to be pleased with the sign that is placed in front of Haskell Bros' trunk store, at No. 52 Madison street, Chicago. An inspection of the accompanying engraving, which is from a photograph, will show that the base is inscribed with the name of the firm. The main part of the sign is spiral in design, and is of solid brass, excepting a small hole through the center to allow gas or electric wires to pass through. The base is also of brass. The trunk, which is placed on top of the



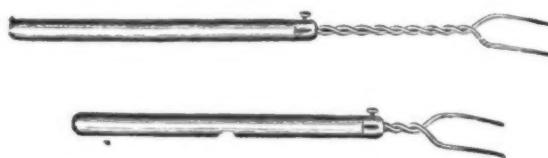
*An Interesting Sign.*

spiral, is mainly constructed from beveled French plate glass, which is held in position by a brass frame representing the usual trimmings of an ordinary trunk. When the glass trunk is illuminated in the evening it is perhaps unnecessary to remark that "all who pass by can see." The entire sign, excepting the glass part, being polished as bright as gold, is elegant in the extreme when viewed by electric light in the evening, or by the light of day. This sign, which is one of the finest in the world, was made by P. E. Guerin, New York City. The weight is over 800 pounds and the cost was over \$800.

The new hotel for W. W. Astor, to be erected on Fifth avenue and Fifty-ninth street, will be a marvel of architecture. From foundations on the bed rock the structure will tower 17 stories above the surface and be of fire proof construction, costing \$1,000,000. The site measures 100 x 125. The first four stories will be of rough hewn brown stone with arched entrance on each street. The next seven will be of yellow brick. The twelfth will be of brown stone with a heavy cornice and balustrade to relieve towering appearance, and the stories still higher will be of green brick. Architectural plans by W. H. Hume.

**New England Extension Steel Fork.**

Hamblin & Russell Mfg. Company, Worcester, Mass., and 44 Cliff street, New York, are introducing an extension fork, as illustrated herewith. The fork is made of two pieces of steel wire twisted. The

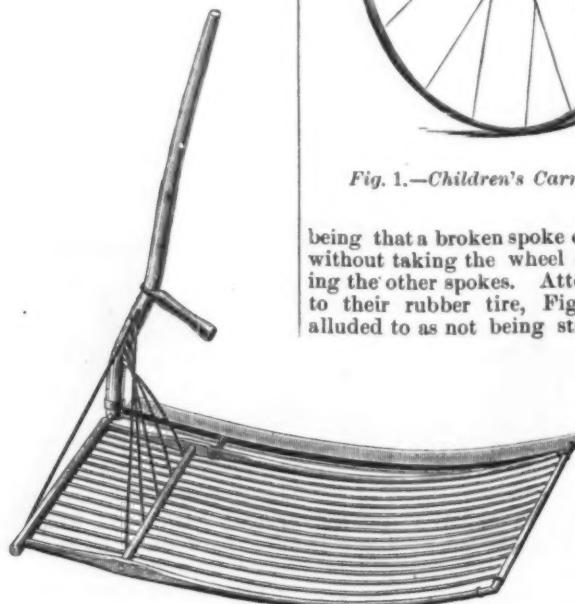


New England Extension Steel Fork.

handle is of wood, with a set screw in the ferrule to fasten the fork at any desired point. It will be seen by the cut the proportionate lengths to which the fork may be extended. The fork revolves when being pushed in or out of the handle, owing to its spiral construction.

**The Joshua Berry Fourteen Finger Cradle.**

The Seymour Mfg. Company, St. Louis, Mo., are introducing a 14 finger cradle, as illustrated herewith. It is stated that these cradles are now being made by them in much finer form than they have heretofore been produced, they having the exclusive control of the patents, and that



The Joshua Berry Fourteen Finger Cradle.

the cradles will be given the benefit of their Creedmore fastening. The manufacturers claim that the cradles as now produced are light and much stronger than those originally made, and that the finish is equal to that of other goods. The point is made that the merits of the Berry cradle will be appreciated by those who use them in short grain, as they are intended to prevent all scattering and to take everything clean.

It is figured out that since 1887 no less than \$250,000,000 of British capital has been invested in the United States outside of channels that are usually described as speculative. Furthermore, according to the London *Economist*, a very high authority, there has been a shrinkage of nearly \$300,000,000 in the market value of the principal British investments in South America since the date this year when they reached their highest price.

**Children's Carriage Wheels.**

The Harris Metal Wheel Company, Toledo, Ohio, are putting on the market a metal wheel for children's carriages and express wagons, with an improved hub, as shown in Fig. 1. These wheels are



Fig. 1.—Children's Carriage Wheel.

described as made of the best malleable iron and steel, and the spokes are of steel wire made especially for their use. The great advantage in these wheels is referred to as



Fig. 2.—Rubber Tire on Metal Wheel.

being that a broken spoke can be replaced without taking the wheel apart or injuring the other spokes. Attention is called to their rubber tire, Fig. 2, which is alluded to as not being stretched on the

wheel, but is held between the flanges in its natural state. The point is made that when it is cut it does not open or separate, and in case of the rubber wearing out it

a scheme for colonizing Manitoba during the coming season, by offering exceptionally low rates from Europe, and that the Government will favor the project.

**The Gem Hinge and Gem Fastener.**

C. C. Richmond & Co., 8 Central Wharf, Boston, Mass., are introducing the Gem hinge and fastener manufactured by F. W. Lowe Mfg. Co., as illustrated in Figs. 1 and 3. The hinge consists of two straps, connected by a straight piece. This connecting piece is hinged at each

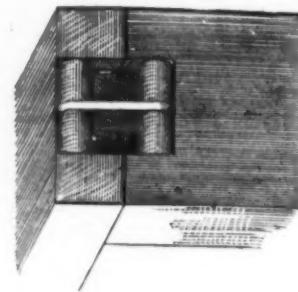


Fig. 1.—The Gem Hinge with the Box Lid Closed.

end, so as to admit of the free play of the strap pieces. The piece connecting the straps is long enough to allow the box cover to swing clear and lay flat against the side of the box when open, as shown in Fig. 2. The hinge is let into the ends of box and cover so no part of the hinge

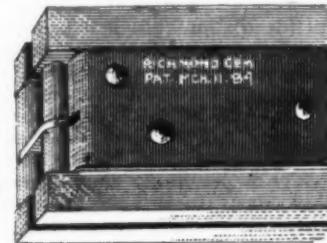


Fig. 2.—The Gem Hinge with the Box Lid Open.

projects above the wood when the cover is open or closed. The fastener, Fig. 3, is fastened to the under side of the lid opposite the hinge so the front of the push is flush with the outside of the box, the strike being placed immediately under it

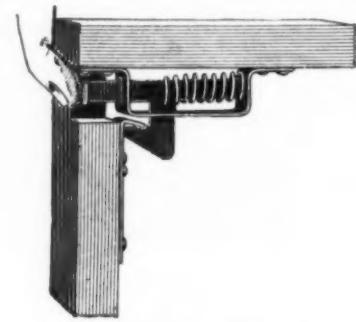


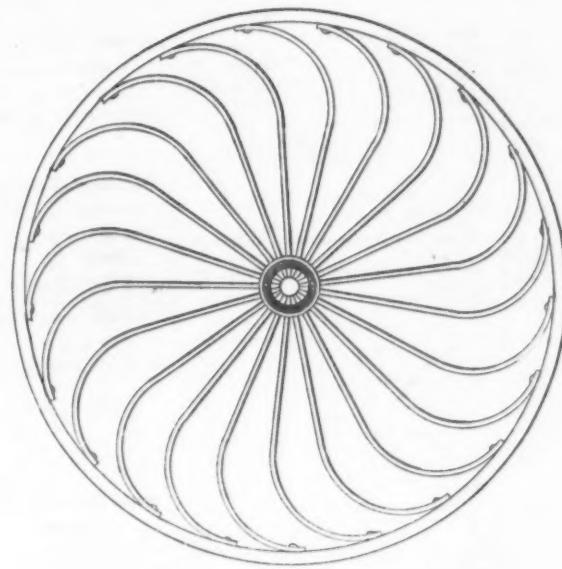
Fig. 3.—The Gem Lid Fastener.

on the inside of the box. It is automatic in locking when the lid is closed, and can be unfastened by pressing back the spring through a hole cut for this purpose. The hinge and fastener are neat in appearance, being cut from polished sheet metal, and are intended for beer, egg and milk cases. They are referred to as possessing advantages over the old style of strap hinge for this purpose.

**The Leggett Metal Wheel.**

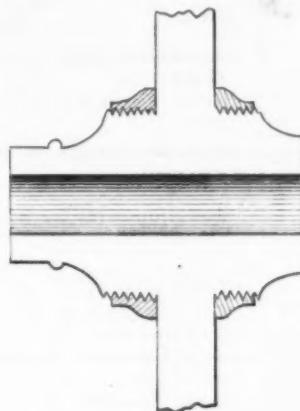
William Leggett, Passaic, N. J., is the inventor of a metal wheel for carriages, as illustrated in Fig. 1. The spokes are made of flat spring steel, curved near the felloe or tire, in such a manner as to secure the greatest elasticity. They are

less. This tire is fastened on to the wheel by a patent process, which it is stated prevents the tire from coming off in use while it can be removed entire, if desired. Unsuccessful attempts have heretofore been made to use rubber tire upon rigid metal wheels, because the rigid metal upon one side and the roadbed upon the other, at

Fig. 1.—*Leggett's Metal Wheel.*

fastened to the felloe either by bolts or welded by electricity. The extended portions of the spokes assembled form the hub, as shown in Fig. 2, being held firmly together by bands on both sides of the spokes. These bands are threaded on the inside, corresponding to threads cut

once grinds the rubber to pieces. The elasticity imparted by the shape and arrangement of the spokes is referred to as prolonging the life of the rubber and

Fig. 2.—*The Extended Portion of the Spokes Forming the Hub.*

on the hub. This arrangement is to allow spokes to be replaced at any time without injury to any portion of the wheel. The object of this invention is to produce an elastic metal wheel, in which lightness, durability and strength are combined, and also to lessen the noise usually accompany-

Fig. 3.—*Channeled Felloe and Rubber Tire.*

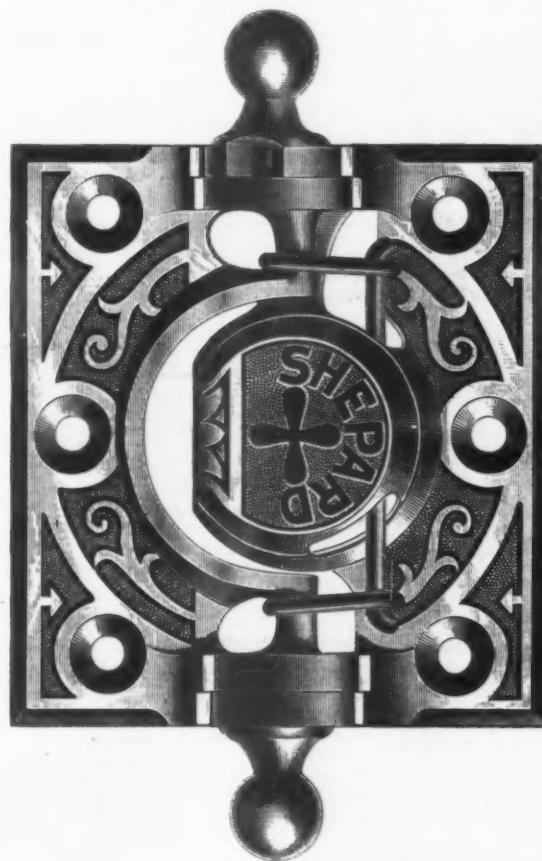
ing metal wheels. The inventor also advises us that the wheel is adapted for the use of rubber tire, in which case a channelled rim or felloe is provided, a sectional cut of which is given in Fig. 3. The rubber tire is intended to render the wheel noise-

renders its use, at a reasonable cost, possible. The peculiar arrangement of the spokes at the center is alluded to as giving great strength and lateral firmness to the wheel, while the rubber tire and the spring spokes are intended to react upon each other, thus distributing and equalizing the strain and shock and prolonging the life of both

H

**Shepard's Niagara Spring Hinge.**

The Shepard Hardware Company, Buffalo, N. Y., are introducing a Spring Hinge, as illustrated herewith. It is described as a spring hinge of the hold back pattern, and the following points of excellency are mentioned: That it is of a handsome design; that the No. 9 standard gauge steel wire used for the spring is tinned, improving the appearance of the hinge and also protecting it from rust; that the construction of the spring is such that the coil is moved or twisted very little when the door is opened, which is referred to as preserving its elasticity, saving the spring from wear, and also giving it the greatest tension at the closing point where it is needed; that the coil spring is large in diameter, so that the spring is less apt to become set than would be the case were the diameter of the spring coil smaller; and that steel links are used, which is considered an advantage over cast links. A feature which is alluded to as being new is that it has self-adjusting gauges for attaching. The point is made that by a simple device cast on the lower side of one of the leaves, the hinge, while being screwed in its place, is held in line with the jamb or casing, thus insuring perfect working. These hinges are reversible, and may be hung either side up. They are finished in black japan Indian bronze or brass plated.

Shepard's *Niagara Spring Hinge.*

Boston and San Francisco, and the commencement of works at Hampton Roads, Va., and on the Potomac, below Washington.

The value of phosphate lands in South Carolina, which it is proposed shall be transferred to a British syndicate, is \$10,000,000.

# CURRENT HARDWARE PRICES.

DECEMBER 3, 1890.

Note.—The quotations given below represent the Current Hardware Prices which prevail in the market at large. prices, and manufacturers should not be held responsible for them. In cases where goods are quoted at lower figures than the manufacturers name, it is not stated that the manufacturers are selling at the prices quoted, but simply that the goods are being sold, perhaps by the manufacturers, perhaps by the jobbers at the figures named.

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## Adjusters, Blind.

Domestic..... \$ per doz \$3.00, 33¢  
Excelsior..... \$ per doz \$10.00, 50¢  
Washburn's Self-Locking..... 20¢ & 20¢ & 10¢

## Ammunition.—

Caps, Percussion, 1000—  
Glock & Goldmark's and Union Metallic Cartridge Co.  
F. L. Waterproof, 1-10's..... 34¢ & 35¢  
E. B. Trimmed Edge, 1-10's..... 40¢ & 45¢  
E. B. Grnd. Edge, Cent. Fire, 1-10's..... 40¢ & 47¢  
Musket Waterproof, 1-10's..... 50¢  
G. D. ..... 28¢  
S. B. Genuine Imported..... 54¢ & 55¢  
Eley's E. B. ..... 54¢ & 55¢  
Eley's D. Waterproof, Central Fire..... \$1.00  
Cartridges—

Rim Fire Cartridges..... 50¢ & 2 1/2¢  
Rim Fire Military..... 15¢ & 2 1/2¢  
Cent. Fire, Pistol and Rifle..... 25¢ & 2 1/2¢  
Cent. Fire, Military and Sporting..... 15¢ & 2 1/2¢  
Blank Cartridges, except 22 and 32 cal., additional 10¢ on above discounts.  
Blank Cartridges, 22 cal., \$1.75..... 2 1/2¢  
Blank Cartridges, 32 cal., \$3.50..... 2 1/2¢  
Primed Shells and Bullets..... 15¢ & 2 1/2¢  
B. B. Caps, Round Ball, \$1.75..... 2 1/2¢  
B. B. Caps, Con. Ball, Swgd., \$2.00..... 2 1/2¢

## Primers—

Berdan Primers, \$1.00..... 2 1/2¢  
E. L. Caps (for Sturtevant Shells) \$1.00..... 2 1/2¢

All other Primers, \$1.20..... 2 1/2¢

## Shells—

First quality 4, 8, 10 and 12 gauge..... 25¢ & 10¢ & 2 1/2¢  
First quality, 14, 16 and 20 gauge (\$10 list)..... 30¢ & 10¢ & 2 1/2¢  
Prize..... 40¢ & 2 1/2¢  
Star, Club, Rival and Climax brands..... 33¢ & 10¢ & 2 1/2¢  
Selbold's Comb. Shot Shells..... 15¢ & 2 1/2¢  
Grass Shot Shells, 1st quality..... 60¢ & 2 1/2¢  
Grass Shot Shells, Club, Rival, Climax..... 65¢ & 2 1/2¢

## Shell Loaded—

Standard List, July 10, 1890. 40¢ & 45¢ & 50¢  
Wads—Price per M.

G.M.C. & W. R. A.—B. E., 11 up..... 68¢  
G.M.C. & W. R. A.—B. E., 9 & 10..... 82¢  
G.M.C. & W. R. A.—B. E., 8..... 96¢  
G.M.C. & W. R. A.—B. E., 7..... \$1.10  
U.M.C. & W. R. A.—P. E., 11 up..... 1.15  
U.M.C. & W. R. A.—P. E., 9 & 10..... 1.50  
U.M.C. & W. R. A.—P. E., 8..... 1.70  
G.M.C. & W. R. A.—P. E., 7..... 1.80  
Eley's B. E., 11 up..... \$1.75  
Eley's P. E., 11 & 20..... 2.80

## Anvils.—

Eagle Anvils, 2 1/2 to 10'..... 15¢ & 15¢ & 2 1/2¢  
Peter Wright's..... 11¢ & 14¢  
Armitage's Mouse Hole, 10'..... 10¢ & 11¢  
Armitage's Mouse Hole, Extra, 12 & 12½'..... 12¢ & 12½¢  
Trenton..... 10 to 10½'  
Wilkinson's..... 10¢ & 11¢  
Moore & Barnes Mfg. Co. .... 33¢ & 1/2¢

## Anvil Vise and Drill—

Millers Falls Co., \$18.00..... 20¢  
Cheney Anvil and Vise..... 25¢  
Allen Anvil and Vise, \$3.00..... 40¢ & 10¢  
Star..... 45¢ & 2 1/2¢

## Apple Parers—See Parers, Apple, &c.

## Augers and Bits—

Douglas Mfg. Co.,  
Wm. A. Ives & Co.,  
Humphreysville Mfg. Co.,  
French, Swift & Co. (W. H. Beecher,  
P. S. & W. Co.) ..... 70¢ & 10¢

Rockford Bit Company..... 55¢  
Cook's, Douglas Mfg. Co.,  
Cook, N. H. Copper Co. 50¢ & 10¢ & 20¢ & 2 1/2¢

Ives' Circular Lip..... 60¢  
Patent Solid Head..... 30¢  
C. E. Jennings & Co., No. 10, extension  
tip..... 40¢

C. E. Jennings & Co., No. 30..... 60¢  
C. E. Jennings & Co., Auger Bits, 5 set,  
32 1/2 quarters, No. 5; No. 30, \$3.50, 20¢

Lewis' Patent Single Twist..... 45¢  
Russell Jennings' Augers and Bits 25¢ & 10¢  
Imitation Jennings' Bits..... 40¢ & 60¢ & 5¢

Snell's Jennings' Pattern..... 60¢  
Pugh's Black..... 20¢  
Rockford, Jennings' Pattern..... 60¢  
Car Bits..... 60¢ & 60¢ & 10¢

Car Bits, P. S. & W. Co. .... 60¢ & 10¢  
Snell's Car Bits..... 60¢

L. Hommodieu Car Bits..... 15¢ & 10¢  
Forstner's Pat. Auger Bits..... 20¢  
Cincinnati Bell-Hangers' Bits..... 30¢ & 10¢

## Bit Stock Drills—

Morse Twist Drills..... 50¢ & 10¢ & 5¢  
Standard..... 50¢ & 10¢ & 5¢  
Cleveland..... 50¢ & 10¢ & 5¢

Syracuse, for metal..... 50¢ & 10¢  
Syracuse, for wood (wood list) 30¢ & 30¢ & 5¢

Williams' or Holt's, for metal 50¢ & 10¢ & 10¢  
Williams' or Holt's, for wood..... 40¢ & 10¢

Cincinnati, for wood..... 30¢ & 10¢  
Cincinnati, for metal..... 45¢ & 10¢

## Expansive Bits—

Clark's small, \$18; large, \$22. 35¢ & 35¢ & 5¢  
Ives' No. 4, \$ per doz \$60..... 40¢

Swan's..... 40¢  
Steers', No. 1, \$20; No. 2, \$22..... 35¢  
Stearns' No. 2, \$48..... 30¢

## Gimlet Bits—

Common..... \$ per gross \$2.75 & 35¢ & 25¢  
Diamond..... \$ per doz \$1.10..... 25¢ & 10¢  
Bee..... 25¢ & 25¢ & 5¢  
Double Cut, Shepardson's.... 45¢ & 10¢ & 10¢

Double Cut, Ct. Valley Mfg. Co. .... 30¢ & 10¢  
Double Cut, Hartwell's, 7 gr. gro. .... 35¢ & 25¢  
Double Cut, Douglass'..... 40¢ & 10¢

Double Cut, Ives'..... 60¢ & 60¢ & 10¢

## Twist Augers—

Ives' French, Swift & Co. .... 33¢ & 10¢  
Douglass' ..... 33¢ & 210¢

Bonney's Adjustable, \$ per doz \$48..... 40¢ & 10¢

Stearns'..... 20¢ & 10¢

Ives' Expansive, each \$4.50..... 50¢ & 25¢

Universal Expansive, each \$4.50..... 50¢ & 25¢

Wood's..... 25¢ & 25¢ & 10¢

Cincinnati Adjustable..... 25¢ & 10¢

Cincinnati Standard..... 25¢ & 10¢

## Ship Augers and Bits—

L'Hommeau's..... 15¢ & 10¢ & 10¢ & 2 1/2¢

Watrous'..... 15¢ & 10¢ & 10¢ & 10¢

Snell's..... 15¢ & 10¢ & 10¢ & 10¢

Snell's Ship Auger Pattern Car Bits, 15¢ & 10¢ & 10¢

## Awl Harts—See Harts, Awl.

## Awls, Brad Sets, &c.—

Awls, Sewing, Common, 7 gr \$1.70, 35¢

Awls, Should. Peg, 7 gr \$2.40, 40¢ & 40¢ & 10¢

Awls, Pat. Peg, 7 gr \$3.60, 40¢ & 40¢ & 10¢

Awls, Shouldered Brad, 2.70 gr. .... 35¢ & 25¢

Awls, Handled Brad, .... 7.50 gr. .... 45¢ & 35¢

Awls, Handled Scratch, 7 gr. .... 45¢ & 35¢

Awls, Socket Scratch, 7 gr. .... 1.50 & 25¢ & 30¢

## Awl and Tool Sets—See Sets, Awl and Tool.

## Axes—

Plain, Beveled, First quality..... \$8.00..... \$8.50

Others..... 7.50..... 8.00

## Axle Grease—See Grease, Axle.

## Axes—

No. 1, 14¢ & 5¢, No. 2 5¢ & 6¢ & 5¢

Nos. 7 to 14..... 55¢ & 5¢

Nos. 15 to 18..... 47¢ & 5¢

Nos. 19 to 23..... 70¢

Concord Axes, loose collar..... 5¢ & 6¢

Concord Axes, solid collar..... 6¢ & 7¢

National Tubular Self-Oiling..... 33¢ & 33¢ & 25¢

## Bag Holders—See Holders, Bag.

## Balances—

Spring Balances..... No. 2000, 20..... 30

Chatillon, \$ per doz \$0.80, 0.95, 1.75 net

Chatillon Straight Balances..... 40¢

Chatillon Circular Balances..... 50¢ & 10¢

## Bars.

### Crown—

Cast Steel..... \$ per lb. 44¢ & 45¢

Iron, Steel Points..... \$ per lb. 34¢ & 35¢

### Bins, Wash—

Standard Fibreware, No. 1, 10 1/2-inch, 20

12-inch, \$2.25; 13 1/2-inch, \$2.75; 16-inch, \$3.25.

## Beams, Scale—

Scale Beams, List Jan. 12, '92..... 50¢ & 10¢

Chatillon's No. 1..... 50¢ & 10¢

Chatillon's No. 2..... 50¢ & 10¢

Custer's..... 33¢ & 10¢

## Beaters—

### Egg—

Dover..... \$ per doz \$1.50

Duplex (Standard Co.)..... \$ per doz \$1.25

Rival (Standard Co.)..... \$ per doz \$1.00

Duplex Extra Heavy (Standard Co.)..... \$ per doz \$3.50

Bryant's..... \$ per doz \$1.40

Double H. & R. Mfg. Co., 1st No. 1, \$1.00; No. 2, \$1.25

Easy (H. & R. Mfg. Co.)..... \$ per doz \$1.20

Triple (H. & R. Mfg. Co.)..... \$ per doz \$1.50

Spiral (H. & R. Mfg. Co.)..... \$ per doz \$4.50

Improved Acme (H. & R. Mfg. Co.)..... \$ per doz \$9.00

Paine, Diehl & Co.'s..... \$ per doz \$2.00

Silver & Co. .... \$ per doz \$5.50

## Bearers, Tap.

Common and Kind..... 20¢ & 10¢

Ive's Tap Borers..... 33¢ & 5¢

Enterprise Mfg. Co. .... 20¢ & 10¢ & 5¢

Clark's..... 33¢ & 35¢

## Berax.

.... \$ 9¢ & 10¢ & 10¢

## Boring Machines—See Machines, Boring.

## Bow Pins—See Pins, Bow.

## Bowes, Wagon.

Per S. .... 2¢ & 10¢

## Braces.

### American Bit Brace Co.

Nov. 10, 12, 20..... 60¢ & 10¢

Nos. 11, 21, 24, 27..... 70¢ & 10¢

Nos. 22, 23, 25..... 60¢ & 10¢ & 5¢

Nos. 13, 26, 36, 37..... 70¢ & 10¢ & 5¢

Ball Braces, net..... \$1.12 to \$1.35

Amidon's

Barker's Imp'd Plain..... 75¢ & 10¢ & 5¢

Barker's Imp. Nickelized..... 65¢ & 10¢ & 70¢

Ratchet..... 75¢ & 10¢ & 5¢

Eclipse Ratchet..... 60¢ & 10¢ & 5¢

Globe Jawed..... 60¢ & 10¢ & 5¢

Corner Brace..... 40¢ & 40¢ & 10¢

Universal, 8 in., \$2.10 to \$2.10 in. .... 32¢ & 25¢

Buffalo Ball..... \$1.10 & \$1.15

Barber's, 10 to 16..... 60¢

Nos. 30 to 33..... 60¢

Nos. 40 to 63..... 50¢ & 10¢

## Braziers.

Barker's Imp. Polished..... 75¢ & 10¢ & 5¢

Barker's Imp. Nickelized..... 65¢ & 10¢ & 70¢

Ratchet, Polished..... 60¢ & 10¢ & 5¢

Ratchet, Nickelized..... 40¢ & 10¢ & 5¢

Buffalo Ball..... net, \$1.10 & \$1.15

Nos. 25, 27 and 30..... 50¢ & 10¢ & 5¢

Nos. 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 23

Chucks—	
Reach Pat.	each, \$8.00.....
Homer's Adjustable	each, \$7.00, 20¢ & 20½¢
Danbury	each, \$6.00, 30¢ & 30½¢
Syracuse, Bals Pat.	25¢
Skinner's Patent Chucks.	
Combination Lathe Chucks	23¢ & 4¢
Universal Lathe Chucks	40¢
Independent Lathe Chucks	40¢
Drill Chucks	10¢
Union Mfg. Co., Victor	\$8.50, 25¢
Combination	10¢
Universal	40¢
Independent	40¢
Churns.	
Tiffin Union No. 1, 5 gallon	\$.32 25 each
Tiffin Union No. 2, 7 gallon	\$.37 50 each
Tiffin Union No. 3, 10 gallon	\$.42 50 each
Clamps—	
R. I. Tool Co.'s Wrought Iron	25¢
Adjustable, Cincinnati	15¢ & 10¢
Adjustable Hammers	15¢
Adjustable, Stearn's	30¢ & 10¢
Stearn's Adjustable Cabinet Cabinet	50¢ & 10¢
Cabinet, Sargent's	60¢ & 10¢
Carriage Makers, Sargent's	70¢ & 10¢
Carriage Makers, T. S. & W. Co.	40¢ & 10¢
Eberhard, Mfg. Co.	40¢ & 20¢ & 40¢ & 10¢
Warren's	40¢ & 10¢ & 20¢ & 10¢ & 5¢
Saw Clamps, see Vises, Saw Filers	
Carpenters', Cincinnati	25¢ & 10¢
Cleavers.	
Butchers'.	25¢ & 20¢
Bradley	20¢ & 15¢
L. & J. J. White	20¢ & 15¢
Beatty's	40¢ & 40¢
New Haven Edge Tool Co.'s	40¢
P. S. & W.	30¢ & 20¢ & 30¢ & 10¢
Foster Bros.	30¢
Schulte, Lohoff & Co.	40¢ & 40¢
Clips—	
Norway, Axle, ¾ & 5-16	55¢ & 5¢ & 5¢
2nd grade Norway Axle, ¾ & 5-16	60¢ & 5¢
Superior Axle Clips	60¢ & 5¢ & 70¢
Norway Spring Bar Clips, 5-16, 20¢ & 25¢	
Wrought-Iron Felloc Clips	¾ b, 5¢
Steel Felloc Clips	¾ b, 5¢
Baker Axle Clips	12¢
Cloth and Netting, Wire—See	
Wire, &c.	50¢
Cockeyes	50¢
Cocks, Brass.	
Hardware list	50¢ & 25¢
Coffee Mills—See Mills, Coffee.	
Collars, Dog, &c.	
Medford Fancy Goods Co.	40¢ & 10¢
Embossed, Gilt, Pope & Steven's list	30¢ & 10¢
Leather, Pope & Steven's list	40¢
Brass, Pope & Steven's list	40¢
Chapman Mfg. Company	50¢ & 10¢ & 60¢
Combs, Curry.	
Fitch's	50¢ & 10¢ & 50¢ & 10¢ & 10¢
Rubber, per doz \$10.00	20¢
Perfect.	50¢
Compasses, Dividers, &c.—	
Compasses, Callipers, Dividers	70¢ & 70¢ & 10¢
Benn's & Call Co.'s	
Dividers	60¢ & 5¢
Compasses & Callipers	50¢ & 5¢
Wing and Inside or Outside	50¢ & 5¢
Double	60¢
(Call's Pat. Inside)	30¢
Excelsior	50¢
Diggers, Post Hole, &c.—	
Samson Post Hole Digger	per doz \$36.00
Fletcher Post Hole Augers	per doz \$36.00
Samson Post Hole Auger	per doz \$36.00
Leed's	per doz \$36.00 & \$9.00
Vaughan's Post Hole Auger	per doz \$36.00
Gibbs Post Hole Digger	per doz \$30.00, 50¢
Imperial	per doz \$15.....
Dividers—	
See Compasses.	
Dog Collars—See Collars, Dog, &c.	
Door Springs—See Springs, Door.	
Drawers.	
Money, per doz	\$16 & \$20
Drawing Knives—See Knives, Drawing.	
Drills and Drill Stocks—	
Blacksmiths'	each \$1.75
Blacksmiths' Self-Feeding	each \$1.50, 20¢
Breast, P. S. & W.	40¢ & 10¢
Breast, Wilson's	30¢ & 5¢
Breast, Miller's Falls	each \$3.00, 25¢
Breast, Bartholomew's	each \$2.50, 25¢ & 10¢ & 40¢
Ratchet, Merrill's	20¢ & 20¢ & 5¢
Ratchet, Ingersoll's	25¢
Ratchet, Parker's	20¢ & 20¢ & 5¢
Ratchet, Whitney's	20¢ & 10¢
Ratchet, Weston's	20¢ & 25¢
Ratchet, Moore's Triple Action	25¢ & 10¢
Ratchet, Moore's & Clegg's	30¢ & 10¢
Whitney's Hand Drill, Plain	\$1.00
Adj.-table	\$12.00
Wilson's Drill Stock	10¢
Automatic Boring Tools	per doz \$1.75
Twist Drills—	
Morse	50¢ & 10¢ & 5¢
Standard	50¢ & 10¢ & 5¢
Syracuse (Metal list)	50¢ & 10¢
Cleveland	50¢ & 10¢ & 20¢
Williams	50¢ & 10¢ & 10¢
New Process	50¢ & 10¢ & 5¢
Drill Bits.—See Augers and Bits.	
Drill Chucks.—See Chucks.	
Dripping Pans—See Pans, Dripping.	
Drivers, Screw.	
Douglas Mfg. Co.	20¢ & 20¢ & 10¢
Diaston's	10¢
Buck Bros.	30¢
Stanley R. & L. Co.'s	
Varnished Handles	45¢ & 10¢
Black Handles	60¢ & 10¢
Sargent & Co.'s	
No. 1 Forged Blade	60¢ & 10¢ & 10¢
Nos. 20, 30 and 60	60¢ & 10¢ & 5¢
P. S. & W.	70¢
Knapp & Cowles' No. 1	60¢ & 10¢ & 10¢
No. 1 Extra	60¢ & 10¢ & 10¢
Nos. 0 & 4	50¢ & 10¢ & 10¢ & 5¢
Stearns'	25¢ & 10¢ & 5¢
Gay & Parsons	35¢
Champion	35¢ & 10¢
Clark's Pat.	30¢ & 33¢ & 5¢
Crawford's Adjustable	30¢
Allard's Spiral, new list	25¢
Kolb's Common Sense	per doz \$6.00, 25¢ & 10¢
Syracuse Screw-Driver Bits	30¢ & 30¢ & 5¢
Screw Driver Bits	per doz \$6.00 & 75¢
Corkscrews—See Screws, Cork.	
Corn Knives and Cutters—See	
Knives, Corn.	
Crackers, Nut—	
H. & R. Mfg. Co.	40¢
Blake's Pattern	per doz \$2.00, 10¢
Turner & Seymour Mfg. Co.	50¢
Cradles—	
Grain	50¢ & 5¢ & 50¢ & 10¢ & 25¢
Crayons.	
White Crayon, F. gr. 12¢ & 12½¢	.10¢
D. M. Stewart Mfg. Co., Metal Work-	
ers	per doz \$2.50.....
J. M. Stewart Mfg. Co., Rolling Mill	25¢
per gr. \$2.50	.25¢
See also Chalk.	
Crow Bars—See Bars, Crow.	
Curry Combs—See Combs, Curry.	
Curtain Pins—See Pins, Curtain.	
Cutters—	
<i>Meat.</i>	
Dixon's F. dos.	40¢ & 5¢
Nos. 1 2 3 4	14¢ 17¢ 19¢ 20¢
Woodruff's F. dos	40¢ & 5¢
Nos. 100 150	15¢ 18¢
Hales Pattern F. dos	70¢ & 75¢ & 5¢
Nos. 11 12 13	17¢ 20¢ 22¢
American	30¢
Nos. 1 2 3 4 B	15¢ 18¢ 20¢ 22¢
Enterprise	30¢
Nos. 10 12 22 32 42	15¢ 18¢ 20¢ 22¢ 25¢
Each	25¢ 28¢ 34¢ 36¢
Great American Meat Cutter	30¢
Nos. 112 116 120 124	15¢ 18¢ 20¢ 22¢
Miles' Challenge F. dos	25¢ & 20¢ & 10¢
Nos. 822 830 840 840	15¢ 18¢ 20¢ 22¢
Horno No. 1	20¢
Nos. 5 6 8	12¢ 15¢ 18¢
350 375 390 395	20¢ & 25¢
Great American	30¢
Little Giant	50¢
Chadborn's Smoked Beef Cutter	per doz
Tobacco	86¢
Champion	20¢ & 10¢ & 5¢
Wood Bottom	per doz \$6.00, 5¢ & 25¢
All Iron	per doz 42¢
Nashua Lock Co.'s	per doz \$18.00, 50¢ & 55¢
Wilson's	55¢
Sargent's	per doz \$24, 50¢ & 10¢
Acme	per doz \$20, 40¢
Washer.	
Smith's Pat.	per doz \$12.00, 20¢ & 10¢ & 10¢
Johnson's	per doz \$11.00, 33¢ & 40¢
Penny's	per doz \$11, 15¢ & 25¢
Appleton's	per doz \$10.00, 20¢ & 10¢
Bonney's	30¢ & 10¢
Cincinnati	25¢ & 10¢
Cutlery—	
Pocket and Table	Net prices
Wostenholm	New list in preparation
Dampers, &c.—	
Dampers, Buffalo	40¢ & 10¢
Buffalo Damer Clips	40¢ & 10¢
Crown Damer	40¢
Excelsior	40¢ & 10¢
Diggers, Post Hole, &c.—	
Samson Post Hole Digger	per doz \$36.00
Fletcher Post Hole Augers	per doz \$36.00
Eureka Diggers	per doz \$12.50, 14¢
Leed's	per doz \$36.00 & \$9.00
Vaughan's Post Hole Auger	per doz \$36.00
Gibbs Post Hole Digger	per doz \$30.00, 50¢
Imperial	per doz \$15.....
Dividers—	
See Compasses.	
Dog Collars—See Collars, Dog, &c.	
Door Springs—See Springs, Door.	
Drawers.	
Money, per doz	\$16 & \$20
Drawing Knives—See Knives, Drawing.	
Drills and Drill Stocks—	
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Blacksmiths' Self-Feeding	each \$1.50, 20¢
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Breast, Bartholomew's	each \$2.50, 25¢ & 10¢ & 40¢
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Ratchet, Ingersoll's	25¢
Ratchet, Parker's	20¢ & 20¢ & 5¢
Ratchet, Whitney's	20¢ & 10¢
Ratchet, Weston's	20¢ & 25¢
Ratchet, Moore's Triple Action	25¢ & 10¢
Ratchet, Moore's & Clegg's	30¢ & 10¢
Whitney's Hand Drill, Plain	\$1.00
Adj.-table	\$12.00
Wilson's Drill Stock	10¢
Automatic Boring Tools	per doz \$1.75
Twist Drills—	
Morse	50¢ & 10¢ & 5¢
Standard	50¢ & 10¢ & 5¢
Syracuse (Metal list)	50¢ & 10¢
Cleveland	50¢ & 10¢ & 20¢
Williams	50¢ & 10¢ & 10¢
New Process	50¢ & 10¢ & 5¢
Drill Bits.—See Augers and Bits.	
Drill Chucks.—See Chucks.	
Dripping Pans—See Pans, Dripping.	
Drivers, Screw.	
Douglas Mfg. Co.	20¢ & 20¢ & 10¢
Diaston's	10¢
Buck Bros.	30¢
Stanley R. & L. Co.'s	
Varnished Handles	45¢ & 10¢
Black Handles	60¢ & 10¢
Sargent & Co.'s	
No. 1 Forged Blade	60¢ & 10¢ & 10¢
Nos. 20, 30 and 60	60¢ & 10¢ & 5¢
P. S. & W.	70¢
Knapp & Cowles' No. 1	60¢ & 10¢ & 10¢
No. 1 Extra	60¢ & 10¢ & 10¢
Nos. 0 & 4	50¢ & 10¢ & 10¢ & 5¢
Stearns'	25¢ & 10¢ & 5¢
Gay & Parsons	35¢
Champion	35¢ & 10¢
Clark's Pat.	30¢ & 33¢ & 5¢
Crawford's Adjustable	30¢
Allard's Spiral, new list	25¢
Kolb's Common Sense	per doz \$6.00, 25¢ & 10¢
Syracuse Screw-Driver Bits	30¢ & 30¢ & 5¢
Screw Driver Bits	per doz \$6.00 & 75¢
Screw-Driver Bits, Parr's	per gro 25¢
Fray's Hol. Hdle. Sets	No. 3, \$14.00 25¢ & 35¢ & 10¢
P. D. & Co.'s all Steel	50¢
Cincinnati	25¢ & 10¢
Brace Screw Drivers	25¢ & 10¢
Buck Bros.' Screw-Driver Bits	25¢ & 10¢
Egg Beaters.—See Beaters, Egg.	
Egg Poachers.—See Poachers, Egg.	
Electric Bell Sets.—See Bells, Electric.	
Emery.—No. 4 to No. 54 to Flour, CF	
Kegs, F. B.	4¢ 6¢ 5¢ 6¢ 7¢ 8¢ 9¢ 10¢ 11¢ 12¢ 13¢ 14¢ 15¢ 16¢ 17¢ 18¢ 19¢ 20¢ 21¢ 22¢ 23¢ 24¢ 25¢ 26¢ 27¢ 28¢ 29¢ 30¢ 31¢ 32¢ 33¢ 34¢ 35¢ 36¢ 37¢ 38¢ 39¢ 40¢ 41¢ 42¢ 43¢ 44¢ 45¢ 46¢ 47¢ 48¢ 49¢ 50¢ 51¢ 52¢ 53¢ 54¢ 55¢ 56¢ 57¢ 58¢ 59¢ 60¢ 61¢ 62¢ 63¢ 64¢ 65¢ 66¢ 67¢ 68¢ 69¢ 70¢ 71¢ 72¢ 73¢ 74¢ 75¢ 76¢ 77¢ 78¢ 79¢ 80¢ 81¢ 82¢ 83¢ 84¢ 85¢ 86¢ 87¢ 88¢ 89¢ 90¢ 91¢ 92¢ 93¢ 94¢ 95¢ 96¢ 97¢ 98¢ 99¢ 100¢
Fruit	
Blizzard	70¢
Double Action Crown	60¢
Crown	60¢
Star	60¢
Peerless and Giant	60¢ & 10¢
Zero and Pet	65¢ & 10¢
Boss	65¢ & 10¢
Keystone, P. D. & Co.	each, \$1.50.... 30¢
Fruit and Jelly Presses—See	
Preserves, Fruit and Jelly.	
Fry Pans—See Pans, Fry.	
Funnels.	
Gersdorff's Perfection, Standard and	
Globe; 7½, 1 gro., 10¢; 2 gro., 20¢;	
2½ to 5 to 10 gro.	30¢
Copper, 1 to 6 doz., 15¢; 6 to 12	
doz., 20¢; over 12 doz.	25¢
Fuse—	
Common Hemp Fuse, for dry ground	\$2.70
Common Cotton Fuse, for dry ground	2.25
Single Taped Fuse, for wet ground	3.25
Double Taped Fuse, for very wet gr.	4.25
Triple Taped Fuse, for very wet gr.	5.25
Small Gutta Percha Fuse, for water	7.50
Large Gutta Percha Fuse, for water	12.00
Gates, Molasses—	
Stebbin's Pattern	75¢ & 10¢ & 5¢ & 20¢
Stebbin's Genuine	60¢ & 10¢ & 10¢
Stebbin's Tinned Ends	40¢ & 10¢
Shase's Hard Metal	50¢ & 10¢
Bush's	20¢
Lincoln's Pattern	70¢ & 10¢ & 10¢
Weed's	20¢ & 10¢
Boss, F. dos.	25¢ & 10¢
No. 1, \$7; No. 2, \$8; No. 3, \$9; No. 4,	\$10
Gauges.	
Marking, Mortise, &c.	60¢ & 10¢
Starrett's Surface, Center and Scratch	25¢ & 10¢
Wire, low list	25¢
Wire, "W" heeler, Madden & Co.	10¢
Wire, "M" race	25¢
Wire, Brown & Sharpe's	10¢ & 25¢
Wire, P. S. & W. Co.	10¢ & 10¢
Gimlets—	
Nail and Spike	50¢ & 10¢ & 5¢
"Eureka" Gimlets	40¢ & 10¢
"Diamond" Gimlets	5¢ gr. 25¢
Double Cut, Shepardson's	45¢ & 25¢
Double Cut, Ives	60¢ & 25¢
Double Cut, Douglass'	40¢ & 10¢
"Bee," F. gr. \$1.25	25¢ & 25¢
Glue—	
Le Page's Liquid	25¢ & 25¢
Upton's Liquid	35¢
Le Page & Co.'s Improved Process	25¢ & 25¢
Glue Pots—See Pots, Glue.	
Grease, Axe.	
Frasier's	Keg 2 b 4¢, Pall 2 b 5¢
Frasier's, in boxes	5¢ gr. \$0.50
Dixon's Everlasting, in bx.	per doz 1¢
Pat. Sewing, Long	\$1.20; 2 b \$2.00
Pat. Peg, Plain Top	per doz \$1.00
Pat. Peg, Leather Top	per doz \$12.00, 45¢ & 10¢
Grindstones—	
Small, at factory	... per ton \$7.50 & 9.00
Grindstone Fixtures—See Fixtures.	
Grindstone.	
Hack Saws—See Saws.	
Hats, Awl.	
Sewing, Brass Ver.	25¢
Pat. Sewing, Short	\$1.00
Pat. Sewing, Long	25¢
Pat. Peg, Plain Top	5¢ gr. \$0.50
Pat. Peg, Leather Top	per doz \$12.00, 45¢ & 10¢
Halters.	
Covert's, Rope, 16 in. Jute	50¢ & 25¢
Covert's, Rope, 16 in. Hemp	50¢ & 25¢
Covert's Adj. Rope Halters	40¢ & 25¢
Covert's Hemp Horse and Cattle Tie	50¢ & 25¢
Covert's Jute Horse and Cattle Ties	60¢ & 10¢ & 25¢
Covert's Adj. Web Halters	35¢ & 25¢
Hammers—	
Handled Hammers—	
Maydole's, list Dec. 1, '85	25¢ & 10¢ & 5¢
Buffalo Hammer Co.	
Humason & Beckley</td	

Boggan's Latches.....	\$0.30 & \$0.35
Bronze Iron Drop Latches.....	\$0.70 & net
Jap'd Store Door Handles—Nuts, \$1.62;	
Plate, \$1.10; no Plate, \$0.88.....	net
Barn Door, \$0.40.....	10¢ & 10¢
Chest and Lifting.....	.70¢
 Wood—	
Saw and Plane.....	40¢ & 10¢ & 40¢ & 10¢ & 25¢
Hammer, Hatchet, Axe, Sledge, &c., 10¢	
Brad Awl.....	7¢ gr \$2.00
Hickory Firmer Chisel, ass'd, \$0.45.....	
Hickory Firmer Chisel, large, \$0.50.....	
Apple Firmer Chisel, ass'd, \$0.50.....	
Apple Firmer Chisel, large, \$0.60.....	
Socket Firmer Chisel, ass'd, \$0.50.....	
Socket Framing Chisel, ass'd, \$0.50.....	
J. S. Smith & Co.'s Pat File.....	.50¢
File, assorted, \$0.75.....	.40¢
Auger, assorted, \$0.50.....	.40¢ & 10¢
Auger, large, \$0.75.....	.40¢ & 10¢
Pat. Auger, Ives.....	.30¢ & 10¢
Pat. Auger, Douglass.....	set \$1.21
Pat. Auger, Swan's.....	set \$1.00
Hoe, Rake, Shovel, &c.....	.50¢ & 10¢
 Hangers—	
Barn Door, old patterns.....	.60¢ & 10¢ & 10¢ & .70¢
Barn Door, New England.....	.60¢ & 10¢ & .60¢ & .70¢
Sanson Steel Anti-Friction.....	.65¢
Orleans Steel.....	.55¢
Hamilton Wrought Wood Track.....	.55¢
U. S. Wood Track.....	.65¢
Champion.....	.60¢ & 10¢
Rider and Worcester Medium Mfg. Co.'s List.....	.70¢
Climax Anti-Friction.....	.60¢
Climax Anti-Friction for Wood Track.....	.55¢
Zenith for Wood Track.....	.55¢
Reed's Steel Arm.....	.50¢
Challenge Barn Door.....	.50¢
Sterling's Imp'ed (Anti-Friction).....	.65¢ & 10¢
Victor, No. 1, \$15.00; No. 2, \$16.50; No. 3, \$19.00.....	
Cheritree.....	.50¢ & 10¢
Kidder's.....	.50¢ & 10¢ & .60¢
The Boss.....	.60¢ & 10¢
Best Anti-Friction.....	.60¢ & 10¢
Duplex (Wood Track).....	.60¢ & 10¢ & .55¢
Terry's Pat., \$0. dos pr. 4 in. \$10.00; 5 in. \$12.00.....	.50¢ & 10¢
Terry's Steel Anti-Friction Leader.....	.50¢ & 10¢
Terry's Steel Anti-Friction Ideal.....	.50¢ & 10¢
Gronk's Patent, Steel Covered.....	.50¢ & 5¢
Wood Track Iron Clad, \$0. ft. 10¢.....	.50¢
Carrier Steel Anti-Friction.....	.50¢ & 10¢
Architect, \$0 set \$0.00.....	.20¢
Selins.....	.20¢ & 10¢
Pat. set \$0.50.....	.20¢
Richards'.....	.30¢ & 30¢ & 10¢
Lane's Standard.....	.50¢ & 5¢ & 10¢
Lane's New Standard.....	.50¢ & 5¢ & 5¢
Ball Bearing Door Hanger.....	.20¢ & 10¢ & 10¢
Warner's Pat.....	.20¢ & 10¢ & 10¢
Stearns' Anti-Friction.....	.20¢ & 10¢ & 10¢ & 10¢
Stearns' Challenge.....	.25¢ & 10¢ & .25¢ & 10¢
Faultless.....	.40¢ & 5¢ & 5¢
American, \$0 set \$0.00.....	.20¢ & 10¢
Rider & Worcester, No. 1, 62¢; No. 2, 75¢.....	
Paragon, Nos. 1, 2 and 3.....	.40¢ & 10¢
Cincinnati.....	.25¢ & 10¢
Paragon, Nos. 5, 5½, 7 and 8.....	.20¢ & 10¢
Crescent.....	.60¢ & 10¢ & 10¢
Nickel Cast Iron.....	.50¢
Nickel, Malleable Iron and Steel.....	.40¢
Scranton Anti-Friction Single Strap.....	.35¢
Wild West, 4 in. Wheel, \$15.00; 5 in. Wheel, \$21.00.....	.45¢
Star.....	.40¢ & 10¢ & .40¢ & 10¢ & .50¢
May.....	.50¢ & 5¢ & .50¢ & 10¢
Barry, \$6.00.....	.40¢ & 10¢
 Harness Snaps—See Snaps.	
 Hatchets—	
American Axe and Tool Co.	
Bloom's.....	
Hunt's.....	
Hurd's.....	
Mann's.....	
Peck's.....	
U.S. Marshall's.....	
Buffalo Hammer Co. @	
Fayette R. Plum....	
C. Hammond & Son.....	
Kelly's.....	
Sargent & Co. P. S. & W. Co. ....	
Ten Eyck Edge Tool Co. ....	
Collins.....	10¢
Schulte, Lothrop & Co.....	.60¢ & 50¢ & 5¢
 Hay and Straw Knives—See Knives.	
 Hinges—	
Blind Hinges—	
Parker.....	.75¢ & 2¢
Palmer.....	.50¢ & 5¢ & 10¢
Seymour.....	.70¢ & 2¢
Huffer.....	.50¢
Clark's, Nos. 1, 3, 5, 40 and 50.....	
Clark's Mortise Gravity.....	.75¢ & 10¢ & 5¢ & .80¢
Sargent's, Nos. 1, 3, 5, 11, 13.....	.50¢
Sargent's, No. 12.....	.77¢ & 10¢ & 10¢
Reading's Gravity.....	.75¢ & 10¢ & .75¢ & 10¢
Sheard's Noiseless.....	.75¢ & 10¢
Niagara.....	.80¢
Buffalo.....	.80¢
Clark's Genuine Pattern.....	.80¢
O. S., Lull & Porter.....	.75¢ & 10¢
Acme, Lull & Porter.....	.75¢
Queen City Reversible.....	.70¢ & 10¢ & .75¢
Clark's Lull & Porter, Nos. 0, 1, 1½, 2, 2½, 3.....	.75¢ & 10¢ & .75¢ & 10¢
North's Automatic Blind Fixtures, No. 2, for Wood, \$0.00; No. 3, for Brick, \$11.50.....	.10¢
Gate Hinges—	
Western.....	\$0. dos \$4.40, 60¢
N. E. Reversible.....	\$0. dos \$7.00, 55¢
N. E. Reversible.....	\$0. dos \$5.20, 55¢ & 10¢
Clark's, Nos. 1, 2, 3.....	.60¢ & 10¢ & 5¢
N. Y. State.....	\$0. dos \$5.00, 55¢ & 10¢
Automatic.....	\$0. dos \$12.50, 50¢
Common Sense.....	\$0. dos pair \$4.50, 50¢
Seymour's.....	.45¢ & 10¢
Shepard's.....	.60¢ & 10¢ & 5¢
Seed's Latch and Hinges, \$0. dos \$12.00, 50¢	
 Spring Hinges—	
Union Spring and Blank Butts.....	.40¢
Dear's Spring Hinge Co.'s list, March 1886.....	.20¢
 Irons—	
Acme.....	.90¢
J. S. Empire and Crown.....	.25¢ & 10¢
Geo. and Monarch.....	.55¢
American, Gem, and Star.....	.20¢
Oxford.....	.25¢
Barker's Double Acting.....	.25¢
Union Mfg. Co.....	.30¢
Sommer's.....	.15¢ & 20¢
Chicago.....	.30¢
Wiles'.....	.10¢
Devore's.....	.40¢
Rex.....	.40¢
Royal.....	.60¢
Reliable.....	.60¢
Samson.....	.60¢
Bardisley's Patent.....	.40¢
Stearns'.....	.50¢ & 10¢
Wrought Iron Hinges.....	
Strap and T.....	.75¢ & 10¢
Screw Hook and Strap.....	.6 to 19 in., \$0. 4¢ & 10¢
Screw Hook and Eye.....	.22 to 20 in., \$0. 3¢ & 10¢
Heavy Welded Hook.....	.6 to 12 in., \$0. 4¢ & 10¢
Screw Hook and Eye.....	.14 to 20 in., \$0. 3¢ & 10¢
Heavy Welded Hook.....	.35 to 36 in., \$0. 3¢ & 10¢
Enamel and Tea—See Hollow Ware.	
 Kettles—	
Brass, 7 to 17 in., \$0. 24¢	22¢
Brass larger than 17 in., \$0. 24¢	22¢
 Keys—	
Lock Asso's list Dec. 30, 1886.....	.50¢ & 10¢
Eagle, Cabinet, &c.....	.60¢ & 5¢
Hotchkiss' Brass Blanks.....	.40¢
Hotchkiss, Copper and Tinned.....	.40¢
Hotchkiss' Pad, and Cab.....	.35¢
Batchet Bed Keys.....	.5¢
Wollensak Tinned.....	.50¢ & 10¢
 Knives—	
Eye—	
D. H. Scovil.....	.20¢
Lane's Crescent Planters Pattern.....	.45¢ & 5¢
Lane's Razor Blade, Scovil Pattern.....	.30¢
Maynard, S. & O. Pat.....	.45¢ & 5¢
Sandusky Tool Co., S. & O. Pat.....	.50¢ & 10¢
Am. Axe and Tool Co., S. & O. Pat.....	.60¢ & 10¢
Chattanooga Tool Co., S. & O. Pat.....	.60¢ & 10¢
Grub.....	.60¢ & 10¢
Handled—	
Garden, Mortar, &c.....	.60¢ & 2¢ & 10¢
Planter's, Cotton &c.....	.60¢ & 2¢ & 10¢
Warren Hoe.....	.60¢
Magic.....	.60¢ & 10¢
 Hose Rings and Ringers—See Rings and Ringers.	
 Hoisting Apparatus—See Machines, Hoisting.	
 Hollow Ware—See Ware, Hollow.	
 Holders—	
Bag—	
Sprengle's Pat.....	.70¢ dos \$18.... .60¢
Bit—	
Extension, Barber's, \$0. dos \$15.00.....	.40¢ & 10¢ & 10¢
Ives, \$0. dos \$20.00.....	.60¢ & 10¢ & 10¢
Diagonal.....	.70¢ dos \$24.00, 40¢
Angular.....	.70¢ dos \$24.00, 40¢
File and Tool—	
Balz Pat.....	.70¢ dos \$4.00; 25¢
Nicholson File Holders.....	.20¢
Dick's Tool Holder.....	.20¢
 Hoists—	
Cast Iron—	
Bird Cage, Sargent's list.....	
Bird Cage, Reading.....	.60¢ & 10¢ & 10¢
Clothes Line, Sargent's list.....	
Clothes Line, Reading list.....	.60¢ & 10¢ & 10¢
Ceiling Sargent's list.....	.55¢ & 10¢
Ceiling Sargent's list.....	.55¢ & 10¢ & 10¢
Coat and Hat, Sargent's list.....	.55¢ & 10¢ & 10¢
Coat and Hat, Reading list.....	.55¢ & 10¢ & 10¢
Wrought Iron—	
Cotton.....	.70¢ dos \$1.25
Cotton Pat. (N.Y. Mallet & Handle W'ks).....	.30¢
Tassel and Picture (T. & S. Mfg. Co.).....	.50¢
Wrought Staples, Hooks, &c. See Wrought Goods.	
Wire—	
Wire Coat and Hat, Gem, list April, 1886.....	.50¢
Wire Coat and Hat, Miles' list April, 1886.....	.50¢
Indestructible Coat and Hat.....	.45¢
Wire Coat and Hat, Standard.....	.60¢
Handy Hat and Coat.....	.50¢ & 10¢
Steady Ceiling Hooks.....	.50¢ & 10¢
Belt.....	.50¢ & 10¢
Atlas, Coat and Hat.....	.60¢
Miscellaneous.	
Grass, No. 2, \$2.00; No. 3, \$2.25; No. 4, \$2.50.....	
No. 5 Grass.....	.70¢ dos \$2.25
Bush.....	.55¢ & 60¢
Whiffetree Patent.....	.55¢
Hooks and Eyes—Malleable Iron.	
Bench Hooks.....	.70¢ & 10¢ & 10¢
Hooks and Eyes—Brass.....	.60¢ & 10¢ & 10¢
Wish Hooks, American.....	.50¢
Bench Hooks.....	.See Bench Stops.
 Ladies—	
Melting, Sargent's.....	.55¢ & 10¢
Melting, Reading.....	.30¢ & 10¢
Melting, Monroe's Pat.....	.70¢ dos \$4.00, 40¢
Melting, P. S. & W.....	.35¢ & 10¢
Melting, Warner's.....	.30¢
 Lanterns—	
Tubular—	
Plain with Guards, \$0. dos.....	.44¢ & 4¢
Lift Wire, with Guards.....	.44¢ & 4¢
Square Plain, with Guards.....	.44¢ & 4¢
Sq. Lift Wire, with Guards.....	.44¢ & 4¢
Without Guards, 25¢	20¢ dos less.
Miscellaneous.	
Policeman, Small, \$0.00; Medium, \$7.25; Large, \$9.75.....	
Door Mineral.....	.60¢ & 65¢
Door Por. Jap'd.....	.70¢ & 75¢
Door Por. Nickel.....	.90¢ & 10¢
Door Por. Plated, Nickel.....	.90¢ & 10¢
Drawer, Porcelain.....	.00¢ & 10¢ & 10¢ & 10¢
Yale & Towne Wood, list Dec. 1885, .40¢	
Lothrop's.....	.20¢ & 25¢
Smith's, F. dos, Single, \$3.00 Double, \$3.....	
Knapp & Cowles.....	.50¢ & 10¢ & 20¢
Buffalo, Adjustable.....	.70¢ dos \$3.00, 25¢
Buffalo, Double Adjustable, \$0. dos \$3.00, 25¢	
Buffalo Double Adjustable, \$0. dos \$3.00, 25¢	
 Knobs—	
Door Mineral.....	.60¢ & 65¢
Door Por. Jap'd.....	.70¢ & 75¢
Door Por. Nickel.....	.90¢ & 10¢
Door Por. Plated, Nickel.....	.90¢ & 10¢
Drawer, Porcelain.....	.00¢ & 10¢ & 10¢ & 10¢
Yale & Towne Wood, list Dec. 1885, .40¢	
Lothrop's.....	.20¢ & 25¢
Smith's, F. dos, Single, \$3.00 Double, \$3.....	
Knapp & Cowles.....	.50¢ & 10¢ & 20¢
Buffalo, Adjustable.....	.70¢ dos \$3.00, 25¢
Buffalo, Double Adjustable, \$0. dos \$3.00, 25¢	
Buffalo Double Adjustable, \$0. dos \$3.00, 25¢	
 Ladies Melting, Sargent's.....	
Melting, Reading.....	.30¢ & 10¢
Melting, Monroe's Pat.....	.70¢ dos \$4.00, 40¢
Melting, P. S. & W.....	.35¢ & 10¢
Melting, Warner's.....	.30¢
 Lawn Mowers—See Mowers, Lawn.	
 Leaders, Cattle.	
Humason, Beckley & Co.'s.....	.70¢
Sargent's.....	.60¢ & 10¢
Hotchkiss.....	.30¢
Peck, Stow & W. Co.....	.60¢ & 10¢
 Lemon Squeezers—See Squeezers, Lemon.	
 Lifters, Transom.	
Wollensak's:	
Class 3 and 4, Bronzed Iron.....	.50¢
Class 3 and 4, Bronze Metal.....	.25¢
Class 3 and 4, Brass.....	.25¢
Sky-light Lifters.....	.25¢
Crown, Brass and Steel.....	.50¢
Reinier's, list Sept. 1, 1890.	
Bronzed Iron Rods.....	.50¢ & 10¢ & 10¢ & 25¢
Brass, Real Bronze or Nickel Plate.....	.50¢
 Lawn Hand Fluter, White Metal.....	
Crown Hand Fluter, No. 1, \$1.00.....	
\$12.50; 3, \$10.00.....	
Bronzed Hand Fluter, No. 85 \$0. dos	
Shepard Hand Fluter, No. 85 \$0. dos	
Gold Hand Fluter, No. 1, \$1.00.....	
15¢	

shepard Hand Fluter, No. 110	W dos 411.00	40%
shepard Hand Fluter, No. 96	W dos 35.00	40%
Clark's Hand Fluter.	W dos \$15.00	35%
Combined Fluter and Sad Iron.	W dos \$15.00	30%
Buffalo	W dos \$10.00	10%
Hoisting—		
Moore's Hand Hoist, with Lock Brake.	20¢	
Moore's Differential Pulley Block.	40¢	
Energy Mfg. Co.'s.	20¢	
Washing—		
Anthony Wayne, W dos No. 1, No. 51; No. 2, \$15; No. 3, \$12		
Mallets.		
Hickory.	20¢ 10¢ 20¢ 10¢ 10¢	
Hickoryville.	20¢ 10¢ 20¢ 10¢ 10¢	
B. & L. Block Co., Hickory & L. V.	30¢ 30¢ 30¢ 30¢	
Mattocks. Regular list.	60¢ 10¢	
Measures—		
Standard Fibreware, No. 1, peck, W dozen, \$4; ½ peck, \$3.50.		
Meat Cutters—See Cutters, Meat.		
Mills.		
Coffee—		
Box and Side, List Jan. 1, 1888.	60¢ 25¢	
American, Enterprise Mfg. Co. 20¢ 10¢ 30¢		
The Swift, Lane Bros.	30¢ 10¢	
Mincing Knives—See Knives, Mincing.		
Molasses Gates—See Gates, Molasses.		
Merry Drawers—See Drawers, Money.		
Mowers, Lawn.		
Leading makers.	60¢ 60¢ 10¢ 10¢	
Other makers.	60¢ 10¢ 5¢ 5¢ 10¢ 10¢	
Pennsylvania.	60¢	
Continental.	60¢	
New Model.	60¢ 10¢ 25¢	
New Quaker City.	60¢ 10¢ 25¢	
Great American.	60¢ 10¢ 25¢	
Muzzles—		
Available.	W dos, \$3.00, 25¢	
Nails.		
Cut and Wire. See Trade Report.		
Wire Nails, Papered.		
Association list, July 15, '89.	75¢ 10¢	
Tack Mrs' list.	70¢	
Wire Nails, Standard Penny.		
Card June 1, '89, base.	\$2.35 @ \$2.45	
Horse—See Trade Report.		
Nos 6 7 8 9 10		
Available.	25¢ 25¢ 25¢ 25¢ 25¢	40¢ 5¢ 25¢
Clinton, Fin. 10¢ 17¢ 16¢ 15¢ 14¢.	30¢	
Vasse.	25¢ 10¢ 25¢ 25¢ 25¢	30¢ 10¢ 10¢ 10¢
Lyon.	10¢ 17¢ 16¢ 15¢ 14¢.	30¢
Snowden.	19¢ 17¢ 16¢ 15¢ 14¢.	30¢
Putnam.	25¢ 21¢ 30¢ 10¢ 18¢.	
Vulcan.	23¢ 21¢ 20¢ 19¢ 18¢.	19¢ 6¢ 25¢ 25¢
Northwest'n.	25¢ 23¢ 23¢ 21¢ 20¢.	25¢ 25¢ 25¢
Globe.	23¢ 21¢ 20¢ 19¢ 18¢.	25¢ 10¢ 10¢ 10¢
Boston.	23¢ 21¢ 20¢ 19¢ 18¢.	20¢ 25¢ 25¢
A. C.	25¢ 23¢ 22¢ 21¢ 21¢.	25¢ 10¢ 25¢ 25¢
C. B. K.	25¢ 23¢ 22¢ 21¢ 20¢.	25¢ 10¢ 25¢ 25¢
Maud S.	25¢ 23¢ 22¢ 21¢ 20¢.	40¢ 10¢ 5¢ 25¢
Champlain.	25¢ 6¢ 25¢ 24¢ 23¢.	
Little Star.	each 5.00	
Monarch.	each 7.25	
Champion.	each 5.00	
Dandy.	each 7.50	
Eureka, 1888.	each 16.00	
Bay State.	each 12.00	
Favorite.	each 5.00	
Gem.	each 5.25	
Gold Medal.	each 4.00	
Ideal.	each 4.00	
Improved Bay State.	W dos 27.00 @ 30.00	
New Lighting.	each 5.50	
Oriole.	each 4.00	
Perfection.	each 4.00	
Rocking Table.	each 6.00	
Turntable.	each 4.50	
Victor.	each 18.50	
Waverly.	each 4.00	
White Mountain.	each 4.00	
72.	each 4.25	
Black Eagle Benzine Paste, 5 and 10 lb cans.	each 5.75	12¢ 15¢
Black Jack Water Paste, 5 and 10 lb cans.	each 6.00	12¢ 15¢
Nickel Plate Paste.	each 4.00	
White Mountain.	W dos \$4.50	
Artur Combination.	W dos \$6.50	
Hoosier.	W dos \$13.00	
Saratoga.	W dos \$5.50	
Pencils—		
Faber's Carpenter's.	high list 50¢	
Faber's Round Gilt.	W dos \$2.50	
Dixon's Lead.	W dos \$4.50	
Dixon's Lumber.	W dos \$6.75	
Dixon's Carpenter's.	40¢ 10¢ 10¢	
Picks—		
Railroad or Adze Eye, 5 to 6.	\$12.00	
6 to 7.	\$13.00	60¢ 10¢ 10¢
Picture Nails.—See Nails, Picture.		
Pinking Irons.—See Irons, Pinking.		
Pins.		
Bow—		
Humason, Beckley & Co.'s.	.00¢ 10¢	
Sargent & Co.'s.	\$.17 and \$.18.	.00¢ 10¢
Peck, Stow & W. Co.	.00¢ 10¢ .00¢ 10¢	
Curtafn.		
Silvered Glass.	.net	
White Enamel.	.net	
Escutcheon.		
Iron, list Nov. 11, 1885.	.50¢ 10¢ .50¢ 10¢	
Brass.	.60¢ 60¢ 5¢	
Pullies—		
Hot House, Awning, &c.	.00¢ 10¢	
Japanned Screw.	.00¢ 10¢	
Brass Screw.	.00¢ 10¢	
Japanned Side.	.00¢ 10¢	
Japanned Clothes Line.	.00¢ 10¢	
Empire Saah Pulley.	.55¢ 90¢	
Moore's Saah, Anti-Friction.	.50¢	
Hay Fork, Solid Eye, #4, 60¢.	Swivel.	
44.50.	.50¢ 10¢ 50¢ 10¢	
Hay Fork, "Anti-Friction," 5 in. Solid.	.50¢	
Hay Fork, "Common and Pat."	.50¢	
Bushed.	.50¢	
Hay Fork, Tarbox Pat. Iron.	.50¢	
Hay Fork, Reed's Self-Lubricating.	.50¢	
Shade Rack.	.50¢	
Tackle Blocks.	.50¢	
Moore's Anti-Friction 5 in. Wheel, W dos \$12.00.	.40¢	
Pipes and Plane Irons—		
Wood Planes—		
Molding.	30¢ 25¢	
Bench, First Quality.	4¢ 25¢	
Bench, Second Quality.	.50¢ 25¢	
Bailey's (Stanley R. & L. Co.)	.40¢ 10¢	
Pump—		
Cistern, Best Makers.	.60¢ 60¢ 10¢	
Pitcher Spout, Best Makers.	.5¢ 4¢ 7¢	
Pitcher Spout, Cheaper Goods.	.70¢ 7¢ 8¢	
Punches—		
Saddlers' or Driv'e, good, W dos ..	60¢ 65¢	
Bermis & Call Co.'s Cast Steel Drive.	.50¢ 55¢	
Bermis & Call Co.'s Springfield Socket.	.50¢ 55¢	
Spring, good quality, W dos \$3.50.	25¢	
Spring, Leach's Pat.	.40¢	
Hingham Plane Co.	.50¢ 55¢	
Gage Tool Co.'s Self-Setting.	.20¢ 24¢	
Chaplin's Iron Planes.	.40¢ 24¢	
Jarson's	.30¢ 10¢ .20¢ 10¢	
Standard Tool Co.	.50¢ 50¢	
Plane Irons—		
Butcher's.	.35¢ 25¢ 21¢ 10¢	
Steer's Iron Planes.	.35¢ 25¢ 21¢ 10¢	
Meriden M. Iron Co.'s.	.40¢ 24¢ 21¢ 10¢	
Davis' Iron Planes.	.40¢ 24¢ 21¢ 10¢	
Hingham Plane Co.	.50¢ 55¢	
Gage Tool Co.'s Self-Setting.	.20¢ 24¢	
Chaplin's Iron Planes.	.40¢ 24¢	
Jarson's	.30¢ 10¢ .20¢ 10¢	
Standard Tool Co.	.50¢ 50¢	
Plane Irons—		
Butcher's.	.35¢ 25¢ 21¢ 10¢	
Hickory.	.35¢ 25¢ 21¢ 10¢	
Buck Bros.	.30¢	
Auburn "Thistle."	.35¢ 25¢	
Ohio.	.35¢ 25¢	
Sandusky.	.25¢	
S. & J. J. White.	.25¢	
Plates.		
Feloe.	W B 6¢ 6¢ 6¢	
Pliers and Nippers—		
Button's Patent.	.50¢ 50¢ 10¢	
Hall's No. 2, 5 in.	\$.18.50.	
21¢ 7¢ 10¢.	.20¢ 10¢ 3¢ 5¢	
Humason & Beckley Mfg. Co.	.50¢ 50¢	
Gas Pliers.	.50¢ 50¢	
Gas Pliers, Custar's Nickel Plated.	.60¢ 55¢	
Eureka Pliers and Nippers.	.40¢	
Russell's Parallel.	.25¢	
P. S. & W. Cast Steel.	.50¢	
P. S. & W. Tinner's Cutting Nippers.	.50¢	
Morrill's Parallel.	.20¢ 10¢	
Cronk's 8 in., \$15.00; 10 in.	\$21.00.	
40¢ 40¢ 55¢		
Plumbs and Levels—		
Regular List.	.70¢ 10¢ .70¢ 10¢ 10¢	
Douston's.	.50¢	
Pocket Levels.	.50¢	
Davis Iron Levels.	.50¢	
Davis' Inclinometers.	.10¢ 10¢	
Ponchers.		
Egg.		
Buffalo Steam Egg Poachers, W dos, No. 1, \$6.00; No. 2, \$9.00.	25¢	
Silver & Co. 6-Ring.	25¢	
Pokes, Animal—		
Standard List:		
No. 0 1 2 3 4		
W dos \$3.00 \$3.75 \$4.25 \$4.75 \$5.25		
No. 1 2 3 4		
W dos \$6.00 \$7.00 \$8.00 \$9.00		
Polished, regular goods.	.70¢ 10¢	
Aenea Fry Fans.	.00¢ 10¢	
Pans.		
Dripping.		
Small sizes.	W B 6¢ 6¢	
Large sizes.	W B 5¢ 5¢	
Silver & Co. (Covered).	40¢	
Pans.		
Apple.		
Advance.	W dos \$4.75	
Baldwin.	W dos 5.25	
Bonanza.	each 5.00	
Champion.	each 7.25	
Daisy.	each 4.00	
Eagle.	each 16.00	
Favorite.	each 12.00	
Gem.	each 5.00	
Gold Medal.	each 4.00	
Ideal.	each 4.00	
Improved Bay State.	W dos 27.00 @ 30.00	
New Lighting.	each 5.50	
Oriole.	each 4.00	
Perfection.	each 4.00	
Rocking Table.	each 6.00	
Turntable.	each 4.50	
Victor.	each 18.50	
Waverly.	each 4.00	
White Mountain.	each 4.00	
72.	each 4.25	
Black Eagle Benzine Paste, 5 and 10 lb cans.	each 5.75	12¢ 15¢
Black Jack Water Paste, 5 and 10 lb cans.	each 6.00	12¢ 15¢
Nickel Plate Paste.	each 4.00	
White Mountain.	W dos \$4.50	
Artur Combination.	W dos \$6.50	
Hoosier.	W dos \$13.00	
Saratoga.	W dos \$5.50	
Potato Parers—See Parers, Potato.		
Pots.		
Gum—		
Tinned.	.40¢	
Enamelled.	.40¢ 55¢	
Family, Howe's "Eureka."	.40¢	
Family, L. F. C. "Handy."	.50¢	
Preases.		
Fruit and Jelly—		
Enterprise Mfg. Co.	.20¢ 10¢ 30¢	
Henis.	.70¢ 25¢	
Shenard's Queen City.	.40¢	
Silver & Co.	.70¢ 25¢	
Pruining Hooks and Shears—		
Shears.		
Curtain Hammer.	W dos \$9.00	
Giant, No. 1.	W dos \$15.00, 10¢	
Giant, No. 2.	W dos \$15.00, 10¢	
Pelican.	W dos \$9.00, 25¢	
Pulleys—		
Hot House, Awning, &c.	.00¢ 10¢	
Japanned Screw.	.00¢ 10¢	
Brass Screw.	.00¢ 10¢	
Japanned Side.	.00¢ 10¢	
Japanned Clothes Line.	.00¢ 10¢	
Empire Saah Pulley.	.55¢ 90¢	
Moore's Saah, Anti-Friction.	.50¢	
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Jarson's	.30¢ 10¢ .20¢ 10¢	
Standard Tool Co.	.50¢ 50¢	
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Hickory.	.35¢ 25¢ 21¢ 10¢	
Buck Bros.	.30¢	
Auburn "Thistle."	.35¢ 25¢	
Ohio.	.35¢ 25¢	
Sandusky.	.25¢	
S. & J. J. White.	.25¢	
Plates.		
Feloe.	W B 6¢ 6¢ 6¢	
Pliers and Nippers—		
Button's Patent.	.50¢ 50¢ 10¢	
Hall's No. 2, 5 in.	\$.18.50; .20¢ 7¢ 10¢.	
20¢ 4¢ 10¢ 5¢		
Humason, Beckley & Co., .50¢ 10¢ 50¢ 10¢		
Carrier Steel Rail, .5¢ foot.		
Moore's Wrought Iron.	.50¢	
Rails.		
Sliding Door, Wr't Brass, W B 35¢.	.15¢	
Sliding Door, Bronzed Wr't Iron, .5¢ ft. 7¢.	.10¢	
Sliding Door, Iron, Painted, W foot 4¢, 10¢		
Barn Door Light.in.	.10¢	
Per 100 feet.	\$.12.00	2.50 3.10, 10¢
B. D. for N. E. Hangers.		
Small. Med. Large.		
Per 100 feet.	.42.15	2.70 3.25 net.
Terry's Steel Rail.	.5¢ foot.	
Victor Track Rail, 7¢ 4¢ foot.	.50¢ 55¢	
Carrier Steel Rail, .5¢ foot.	.4¢ 5¢	
Moore's Wrought Iron.	.50¢	
Rakes—		
Cast Steel, Association goods.	.60¢ 60¢ 70¢	
Cast Steel, outside goods.	.60¢ 15¢ 10¢ 70¢ 55¢	
Malleable.	.70¢ 70¢ 25¢	
Gibbs Lawn Rake.	\$.12.00, .50¢ 15¢	
Canton Lawn Rake.	.12.00, .50¢ 10¢	
Fl. Madison Prise Bow Brace and Peerless.		
Fort Madison Steel Tooth Lawn Rake.	\$.12.00.	
Razors—		
J. R. Torrey Razor Co.		
Wostenholme and Butcher.	\$10.00 to 2.	
Jordan's AAAL, list Nov. 1, 1889.	10¢	
Jordan's Old Faithful, list Nov. 1, '89.	50¢	
Electric.	.List net.	
Razor Straps—See Straps, Razor.		
Rings and Ringers.		
Bull Rings.		
Union Nut Co.	.55¢	
Sargent's low list.	.55¢	
Humason, Beckley & Co.	.70¢ 10¢	
Peck, Stow & W. Co.'s.	.50¢ 10¢ 50¢ 10¢	
Elrich Hdw. Co.	.50¢ 50¢ 10¢	
Hog—		
Top of the Hill Ringers.	.70¢ 10¢	
Top of the Hill Rings.	.70¢ 10¢	
Hill's Improved		



Wire Brads & Nails, see Nails, Wire.  
Steel-Wire Brads, R. & E. Mfg. Co.'s  
list..... 50¢ to 10¢

Tapes, Measuring—  
American..... 40¢ to 10¢  
Spring..... 40¢  
Chesterman's, Regular list..... 30¢ to 30¢

Thermometers—  
Tin Case..... 80¢ to 80¢ to 10¢

Thimble Skeins—See Skeins.  
Ties, Bale-Steel  
Standard Wire, list..... 50¢ to 10¢ to 5¢

Tinners' Shears, &c.—See Shears,  
Tinners', &c.

Tinware—  
Stamped, Japanned and Pieced, list  
Jan. 20, 1887..... 70¢ to 10¢ to 10¢ to 5¢

Tire Binders, Upsetters, &c.—  
See Binders and Upsetters, Tire.

Tosses.  
Coopers'—

Bradley's..... 20¢  
Barton's..... 20¢ to 20¢ to 25¢

L. & J. White..... 20¢ to 25¢

Albertson Mfg. Co..... 25¢

Beatty's..... 30¢

Sandusky Tool Co..... 30¢ to 30¢ to 25¢

Gardner, Cincinnati Tool Co..... 30¢

Lumber.

Ring Peavies, "Blue Line"..... 70¢ to \$20.00

Ring Peavies, Common..... 70¢ to \$18.00

Steel Socke Peavies..... 70¢ to \$21.00

Mail Iron Socket Peavies..... 70¢ to \$19.00

Cant Hooks, "Blue Line"..... 70¢ to \$14.00

Cant Hooks, Mail, Socket Clasp, "Blue  
Line" Finish..... 70¢ to \$16.00

Cant Hooks, Mail, Socket Clasp, Com-  
mon Finish..... 70¢ to \$14.50

Cant Hooks, Clip Clasp, "Blue Line"  
Finish..... 70¢ to \$14.00

Cant Hooks, Clip Clasp, Common Fin-  
ish..... 70¢ to \$12.00

Hand Spikes..... 70¢ to \$10.00, 8 ft.,  
\$20.00

Pike Poles, Pike & Hook, 7 ft., 12 ft.,  
\$15.00; 14 ft., \$12.50; 15 ft., \$14.50;  
18 ft., \$17.50; 20 ft., \$21.50.

Pike Poles, Pike only, 7 ft., \$10.00; 12 ft.,  
\$11.00; 14 ft., \$11.00; 16 ft., \$13.00; 18  
ft., \$16.00; 20 ft., \$20.00.

Pike Poles, not bronzed, 7 ft., \$10.00; 12 ft.,  
\$12.00; 14 ft., \$17.00; 16 ft., \$18.00; 18  
ft., \$20.00; 20 ft., \$26.00.

Setting Poles, 7 ft., \$12.00, \$14.00; 14  
ft., \$15.00; 16 ft., \$17.00

Swamp Hooks..... 70¢ to \$18.00

Saw.

Atkins' Perfection..... 70¢ to \$12.00

Atkins' Excelsior..... 70¢ to \$0.00

Atkins' Giant..... 70¢ to \$4.00

Tobacco Cutters—See Cutters, To-  
bacco.

Transom Lifters—See Lifters, Transom.

Traps—  
Game—

Newhouse..... 10¢ to 10¢ to 5¢

Oneida Pattern..... 70¢ to 10¢

Game, Blake's Patent..... 10¢ to 10¢ to 5¢

*Mouse and Rat*—  
Mouse Wood Choker, 9 d holes, 11¢ to 19¢  
Mouse, Round Wire..... 70¢ to \$1.50, 10¢  
Mouse, Cage, Wire..... 70¢ to \$1.50, 10¢  
Mouse, Catch-em-alive..... 70¢ to \$1.50, 15¢  
Mouse, Bonanza..... 70¢ to \$1.50 to \$1.00  
Mouse, Delusion..... 70¢ to \$1.00, 12¢  
Rat, Decoy..... 70¢ to \$1.00, 10¢  
Ideal..... 70¢ to \$1.00  
Cyclone..... 70¢ to \$2.25  
Hotchkiss Metallic Mouse, 5-hole traps,  
70¢ to 90¢; in full cases, 70¢ to 75¢  
Hotchkiss Imp. Rat Killer..... 70¢ to \$18.00  
Hotchkiss New Rat Killer..... 70¢ to \$16.50  
Hotchuk's Rat Killer..... 70¢ to \$16.00

*Trivers*—  
Butter and cheese..... 25¢

*Trimmers, Spike*.

Bonney's..... 70¢ to \$10.00, 50¢

Stearns'..... 70¢ to \$10.00, 50¢

Ives, No. 1, \$15.00; No. 2, \$12.00 70¢ to 10¢

Douglas'..... 70¢ to \$10.00, 50¢

Cincinnati..... 70¢ to 10¢

*Wagon Boxes*—See Boxes, Wagon.

*Washer Cutters*—See Cutters  
Washer.

*Wagon Jacks*—See Jacks, Wagon.

*Ware, Hollow, Enamelled, &c.*

*Cast Iron, Hollow*—

Stove Hollow-Ware—

Ground..... 55¢ to 60¢ to 25¢

White Enamelled-Ware—

Mallin Kettles..... 60¢ to 10¢ to 5¢

Boilers and Saucepans..... 40¢

Tinware, Boilers and Saucepans..... 40¢

Rustine Hollow-Ware..... 60¢ to 50¢ to 25¢

Gray Enamelled-Ware—

Stove..... 50¢

Mallin Kettles..... 60¢ to 10¢ to 5¢

Boilers and Saucepans..... 40¢

Enamelled

Agate and Granite Ware, list Jan. 1,  
1880..... 35¢ to 10¢ to 10¢

Ironclad Enamelled Ware, dis 35¢ to 10¢

Kettles—

Galvanized Tea-Kettles—

Inch..... 6 7 8 9

Each..... 55¢ 60¢ 65¢ 75¢

Standard Fiber—

Per Dzzen.

Wasb Basins, 10½ in..... \$2.00 82¢ to 25¢

Wasb Basins, 12 in..... 2.25 2.75

Kreislers, 11½ in..... 4.00

Cuspidors..... 8.00

See also Pails.

*Indurated Fiber*—25¢

Spittoons, No. 2, 70¢ to 10¢

Basins, Ringed, 70¢, No. 2, \$4.50; 30¢

No. 3, 70¢

Washtubs, Nested, Nos. 0, 1, 2 and 3 (4  
pieces), 7¢ nest.

Keelers, Nested, Nos. 1, 2, 3 and 4 (4  
pieces), 7¢ nest.

Butter Bowls, 15, 17 and 19-inch (3  
pieces), 7¢ nest.

Liquid Measures, pt., qt., 2 qt. and fun-  
nel (4 pieces) set, 8¢ to 10¢

Dry Measures, 1, 2, 4, 8 and 16 qts. (5  
pieces), 7¢ set.

See also Pails.

*Silver Plated, Hollow*—

4 mo. or 5 can in 30 days.

Reed & Barton

Meriden Britannia Co.

Parker's

Howard's

Holloway's

Millett Falls.

Trenton

Merrill's.

Sargent's

40¢ to 10¢ to 10¢

Stephens'

Fisher & Norris Double Screw

15¢ to 20¢

Parallels

Stephens'

15¢ to 20¢

Parker's

15¢ to 20¢

Wilson's

15¢ to 20¢

Howard's

15¢ to 20¢

Hartford Silver Plate Co.

40¢ to 5¢ to 5¢

Willian Rogers Mfg. Co.

15¢ to 20¢

*Washers*—

Size hole..... 5-10 3¢ 15¢ 25¢ to 10¢

Waisters..... 6 6 2.5 2.5¢ to 10¢

In lots less than 200 b., 70¢, add 4¢, 5¢  
boxes 1¢ to list.

*Wedges*—

Iron..... 70¢ to 35¢

Steel..... 70¢ to 4¢

*Weights, Sash*—

Solid Eyes..... 70¢ to \$12.00 to \$10.00

*Paints, Oils and Colors.—Wholesale Prices.*

#### Animal and Vegetable Oils.

Linseed, City, raw, per gal. 62 64

Linseed, City, boiled..... 65 67

Linseed, Western, raw..... 55 57

Lard, City, Extra Winter..... 52 53

Lard, City, Prime..... 49 50

Lard, City, Extra No. 1..... 45 46

Lard, City, No. 1..... 42 43

Lard, Western, prime..... 49 50

Cotton-seed, Crude, prime, off  
grades..... 27 28

Cotton-seed, Summer Yel-  
low, prime..... 34 35

Cottonseed, Summer Yel-  
low, off grades..... 30 33

Sperm, Crude..... 70 72

Sperm, Natural Spring..... 70 72

Sperm, Bleached..... 72 77

Sperm, Natural Winter..... 76 78

Sperm, Bleached Winter..... 81 83

Whale, Crude..... 65 66

Whale, Natural Winter..... 65 66

Whale, Bleached Winter..... 65 66

Whale, Extra Bleached..... 65 66

Sea Elephant, Bleached  
Winter..... 65 66

Menhaden, Crude, Sound..... 20 22

Menhaden, Crude, Southern..... 24 25

Menhaden, Light Pressed..... 31 32

Menhaden, Extra Bleached..... 35 36

Tallow, City, prime..... 30 35

Tallow, Western, prime..... 75 76

Cocoanut, Ceylon..... 84 85

Cocoanut, Cochin..... 84 85

Cod, Domestic..... 31 32

Cod, Foreign..... 33 34

Sal. Elaine..... 31 32

Red Saponified..... 25 26

Sapo..... 21 22

Strait..... 25 26

Olive, Italian, ools..... 70 71

Neatsfoot, prime..... 62 63

Palm, prime, Lagoon..... 64 65

Mineral Oils.

Black, 29 gravity, 25 to 30  
cold test..... per gal. 84 85

Black, 29 gravity, 15 cold  
test..... 9 9

Black, 29 gravity, summer..... 7 8

Cylinder, light, filtered..... 15 16

Cylinder, dark, filtered..... 14 20

Cylinder, dark, st'm refined..... 10 18

Paraffine, 23½ to 24 gravity..... 12 13

Paraffine, 25 gravity..... 11 12

Paraffine, 28 gravity..... 10 11

Paraffine, red, 21 to 22 grtys..... 13 14

Paraffine, red, 23 to 23 grtys..... 13 14

Lead, Add., 100 b., 1.00..... 21.35

Cerber, Rochelle..... 1.35 1.36

Cerber, French Washed..... 1.15 1.25

Cerber, German Washed..... 1.15 1.25

Cerber, American..... 1.15 1.25

Orange Mineral, English..... 9 10

Orange Mineral, French..... 9 10

Orange Mineral, German..... 8 9

Paris White, English Cliff-  
stone..... 90 100 1.10

Paris White, American..... 70 80

Red, Indian, English..... 5 6

Red, Indian, American..... 2 3

Red, Turkish..... 9 10

Red, Venetian, American..... 9 10

Red, Venetian, English..... 100 b. 1.00 21.35

Sienna, Italian, Burnt and  
Powd. 5 6

Sienna, Ital., Burnt Lumps..... 14 15

Sienna, Ital., Raw, Powd. 5 6

Sienna, Ital., Raw Lumps..... 2 3

Sienna, American, Raw..... 14 15

Sienna, American, Burnt and  
Powdered..... 14 15

Talc, French..... 1.15 1.25

Talc, American..... 1.15 1.25

Terra Alba, Fr'ch. 100 b. 72 80

Terra Alba, English..... 80 85

Terra Alba, American No. 1..... 70 75

Terra Alba, American No. 2..... 38 40

Umber, Turkey, Bnt. and  
Powd. 31 40

Umber, Turkey, Raw and  
Powdered..... 31 40

Umber, Turkey, Raw and  
Powdered..... 31 40

Umber, Turkey, Raw and  
Powdered..... 31 40

Vermilion, Americ. Lead. 11 12

Vermilion, Quicks'er, bulk. 11 12

Vermilion, Quicks'er, bags. 11 12

